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Three years ago at the Brussels Congress of the International Association for Testing Materials it was decided to appoint a sub-committee of representatives from Germany, England and the United States to report on international specifications for iron and steel at the session of the congress which has just been held at Copenhagen. The instructions of the committee were as follows: "Committee 1a shall, on the basis of specifications recognized by the national testing associations of Germany, England and the United States of North America, endeavor to establish uniform international specifications for the delivery of materials to countries that do not themselves produce iron in any considerable quantities." The committee made what may be called a progress report at Copenhagen, and the congress passed a resolution welcoming its work, approving in general the principles laid down and inviting the committee to continue its valuable labors in cooperation with the national societies, and, if possible, to lay before the sixth congress definite proposals as to the basis of international specifications. In the committee report just presented at Copenhagen the suggested plan of carrying on the work is the same as that which has been used to such great advantage by the American Society for Testing Materials. The committee also specifically passed the following resolution: "That a standard drop-testing machine for rails be adopted in every country, as has already been done in the United States, in order to make the tests comparative." This does not mean, as we understand it, that all countries must use a drop-testing machine exactly like the one adopted as standard in the United States, but that every country is to have a single standard machine and not to continue the use of machines widely differing from each other. Under present conditions international reports of drop-tests mean very little unless all the conditions are known. It is highly desirable to have the same standard drop-testing machine in use in all countries, since it would then be unnecessary to make allowances in the specifications. This matter will no doubt be gone into thoroughly by the committee, and will be reported on promptly. Dr. Charles B. Dudley was elected president of the International Society for Testing Materials, and the next national congress will be held in the United States in the fall of 1912 on the invitation of the American Society for Testing Materials, of which Dr. Dudley is also president. It is of great importance to American engineers and manufacturers to have international specifications put on a simple and rational basis, and it is probable that definite results can be attained by the time of the next congress.

THE FLAW IN STATE RAILWAY COMMISSIONS.

We have referred heretofore to the play of politics in the railway commission of Illinois to which Governor Deneen has just appointed, as successor to W. H. Boys, chairman, Orville F. Berry, a politician, untrained in railway affairs and one of the Governor's active supporters. This is a western example of that obstinate flaw in state railway commissions—politics in place of personnel—which has done so much both to sap the efficiency of those bodies and to undermine confidence in them alike of the corporations and the people. But there is an eastern example that outclasses in its results the case of Illinois. The eastern example is old but some of its most striking outcomes are very recent; and their sequels are instructive and monitory.

Among the many state railway commissions of the country one which has ranked in the lowest grade has been that of Connecticut. It has been for years treated as a political commission pure and simple, a part of a spoils system the perquisites of which were to be distributed to party workers. The commission has for some ten years been absolutely partisan as well as political, the only modification—and that in form rather than substance—being a provision of the state law which compels one of the three members to be a civil engineer. For some years the commission has been composed of the political "boss" of the dominant party in the state; a sub-boss of the same party; and a civil engineer some 73 years old long retired from active engineering work. The commission has purview of only the steam and street railways of the state. Its mandatory functions and powers under the statutes of the state have been somewhat restricted; but its permissive powers have been very large indeed and the two sets of powers together greater than those of many of the state commissions. It has been able to do much, it could also do little and it has elected to do little, except in the line of outside political activity. Naturally its lapse from duty brought evil in its train, the most glaring being a saturnalia of stock watering of the Connecticut trolleys; and a secondary outcome was the forfeiture of public confidence and a popular outcry two years ago for an efficient public service commission, that outcry synchronizing with the epidemic of railway baiting which had begun to sweep the country.

The public utilities agitation in the state since then has made rapid and sensational progress but only the more salient events can be referred to here. Former Governor Woodruff late in the legislative session of 1907 gave out that unless the

legislature took some steps toward a new public utilities commission he would call an extra session to compel it to do so. The matter was compromised by the appointment of a body of five men to draw up a public utilities measure to be presented to the legislature of 1909. After several public hearings such a measure was drawn. It abolished the old railway commission, increased the new commission from three to five with larger salaries and more extensive powers, and added lighting, water, express and telephone corporations to its jurisdiction. The measure in the legislature of 1909 went to the judiciary committee which "petered" it along, slept on it for months and, at last, reported it unfavorably. Then the lower house became insurgent. It rejected the report, a new joint committee was formed and two new utilities bills reported. In the lower house after the stormiest scenes, in which the corporations and the lobby were most bitterly denounced and the floor of the house twice cleared of lobbyists, the two bills were rejected by narrow majorities. An important, if not a vital factor in a result which has aroused anti-corporation feeling in the state and is certain to pervade the next state campaign, was the reappointment to the railway commission by the late Governor Lilley of its two old members, the "boss" and his lieutenant. The Governor was informed and was fully aware of their character and record. But he owed his nomination to them and, in politics, the created could hardly lift itself above the creator. Naturally, also, the powerful influence of the old commission was thrown against any new measure which would have imperilled their places which now, apparently, are secure for four years more unless in 1911 a new utilities bill meets a different fate. Meanwhile a savage anti-corporation campaign in the state impends.

To such an example and situation let us apply a series of hypotheses. Suppose the Connecticut railway commission had not been made political. Suppose the three—or even one—had been men like former Commissioners Adams and Jackson in Massachusetts. Suppose they had been men both of moral courage and of railway or, at least, business experience. Suppose they had been interpreters of the law both in spirit and letter, exercising the powers permissive as well as the powers mandatory, holding the scales of equity even between corporative misdoing on the one hand and demagogism on the other; and suppose, finally, that the corporations of the state had joined with the appointive authority in choosing such a railway commission, of character, integrity, training, courage and efficiency. Under such conditions in Connecticut would any such semi-crisis as the present have arisen? Would not so called "reform," if asked for at all, been a mere matter of slight amendment of existing statutes and an extension of the field and of the authority of a commission already vested with public and corporation confidence? The objective lesson as to the fundamental values of high personnel in the state railway commissions is one from which other states than Connecticut—and their corporations too—can take wisdom and forethought. Happily it is a lesson which, all over the land, the increasing seriousness of the relation of the commissions to the corporations is slowly but continuously driving home.

THE POSITION OF ENGLISH RAILWAYS.

"I have been forced to the conclusion with the greatest reluctance—for I cannot but think that it is much against the public interest. I can see but one outlet from the position in which English railways find themselves, and that outlet is state purchase." This is the conclusion arrived at by William M. Acworth in his extremely interesting *North American Review* article, printed in another column. It is difficult to pick flaws in his close reasoning. Nevertheless, it is not necessarily true that because we "can see but one outlet" there may not be one or many other outlets developed before that national calamity occurs. It would be a national calamity, because it involves national waste, while the only saving apparently to be effected is in the rate of interest charge on the purchase money, due to the higher and wider credit of the national government. A higher cost of working is not only theoretically to be expected; it is proved by the result of every trial. That part of the community which advocates nationalization consists largely of those who hope for private benefits, more pay per hour for employees and special rates and facilities for traders. If, then, the government should submit for approval a financial prospectus, it would need to show that the nation, as a whole, is to be benefited by railway purchase; that the interest charge on the cost, plus the increased cost of working, is less than the dividends and the rate reductions. Considering the financial situation alone and disregarding for the moment the possibility of incidental benefits of paternal government conduct of transportation, it seems clear that Mr. Acworth's reluctant acceptance of government ownership, because he can at the present moment see no other way out, is not a notable example of the greatest wisdom or farsightedness.

The limits of accomplishment of British railway officers have, we believe, not been reached; their efforts have not been strained; they have not mentally extended themselves as we believe them to be capable of doing. In this connection Mr. Acworth's comment on the work of American railway officers after the panic of 1893 is appreciative and splendidly fair. He might have gone farther and pointed out that after the American panic of October, 1907, there was a similar and singularly able undertaking to clean house, and, although the already high rate of wages of employees suffered no general reduction, nevertheless, by scrutiny and a careful sifting out of the company forces, they were able in many departments to make three men do the work of four men, and this reduction was effected in departments not especially affected by the reduction in traffic.

The impressive lesson which Mr. Acworth might have derived from his observation was that the results of American experience after 1893 had been nearly lost and needed to be learned over again in 1907. We are firmly of the opinion that the British railway officer may accomplish great things if he has the incentive and the chance to do so, just as the American officers have done great things under stress and with a wide opportunity. It is not in accordance with the records of the past that this traditionally conservative nation should, after years of full examintion and discussion, enter upon a huge undertaking discredited by the experience of other nations simply because they presently saw no other outlet; no other way to improve conditions admittedly defective but nevertheless tolerably good. Indeed, such a course could only be excusable when those conditions became intolerable.

The basic reason for the success of American railway undertakings is what Mr. Acworth calls the "abnormal growth of the United States." The development which he instances of a railway in the hands of a receiver ten years ago to a present-day 10 per cent. dividend paying corporation is due to this growth, accompanied, of course, by intelligent, farseeing management and especially the highest engineering skill, and here we find what seems to be the most important reason—more important even than high capitalization—why British railways are facing a progressive decline in net earnings. Due to the shortsightedness of the early engineers, the British railway design is inelastic and incapable of adaptation to heavily increased traffic without undue cost. The wheel gage and the loading gage throughout the Kingdom were made standard on nearly all of the railways with no consideration whatever of the possibilities of future needs. It was simply a thoughtless acceptance of the experience of centuries past. The subsequent growth of traffic has needed to be accompanied in each case, not by increasing the capacity of the line by the use of greatly increased power and larger vehicles at small proportionate cost, but by the building of additional line with

the result of additional capital cost until, as Mr. Acworth says, they are "water logged" with capital.

The result of this we have often pointed out. The line of earnings runs along almost level, with small increases, while the line of expenses tends constantly up to meet it, and it is clear to all that some day these two lines must join. Meantime, dividends are being reduced, and economists and railway managers alike are casting about for expedients.

Now, it has happened many times in the history of specific American railways that the lines of expense have met and crossed the lines of income. In cases where this process continued, the result has been reorganization, accompanied, of course, by some present loss, though the loss has often been turned into a future profit. The American railways as a whole had their worst troubles in their infancy; the British railways are looking forward to theirs in their old age. It is quite natural that the owners of securities should turn to the government for relief; if they can get a 3 per cent. government security with as high a market value as the 4 per cent. railway security which they exchanged for it they will lose nothing, and the details of the exchange might possibly be so arranged as not to involve the government in any present loss. But that the government would have to take future losses seems inevitable. Meantime, the British government is trying many economic experiments, and the budgets are placing progressively harder burdens, year by year, on the backs of the shopkeeper and the small landowner, already sorely beset.

We believe the best solution of the difficulty in which the British railways now find themselves is for the proprietors of these railways to take their losses, and we are inclined to think it is the only solution which will result in durable solvency. Moreover, by the time nationalization of railways becomes an active issue in Great Britain the small landowner will look on the problem primarily from the standpoint of its effect on his taxes, and Dreadnoughts and old-age pensions can be relied on to make him suspicious of great national purchases. If the taxpayer has the British railway system added to his burdens, it is likely to be because he is outvoted; not because he cherishes any illusions on the subject.

REVISING THE ANTI-TRUST LAW AND THE INTERSTATE COMMERCE LAW.

The fact has become recognized in the highest official quarters that the Sherman anti-trust law and the act to regulate commerce, as they now read, are unfair to the railways and harmful to the public. President Taft has appointed a commission of leading officials of the government to outline a plan for the revision of both laws.

The main defect in the two laws as they apply to railways is that they are incompatible. The Sherman act is a law to compel the industries of the country, including the railways, to engage in unrestricted competition. The interstate commerce act is mainly a law to prevent railways from unfairly discriminating. It has been repeatedly pointed out, by the Interstate Commerce Commission and others, that the railways cannot engage in unrestricted competition without unfairly discriminating and that they cannot avoid unfairly discriminating without combining to prevent cut-throat competition. Nothing should be allowed to interfere with the strict enforcement of the prohibitions of the interstate commerce act against unfair discrimination. The Sherman act, as the Interstate Commerce Commission has said, does this. The conclusion that the Sherman law as it applies to railways ought to be repealed inevitably follows.

In an address to the American Bar Association at Portland, Me., in August, 1907, Commissioner Charles A. Prouty pointed out the fundamental defect in the act to regulate commerce. He said in part:

> The Interstate Commerce "Commission, under the present law, is charged with two sets of duties requiring diverse qualifications for their discharge."
>
> It stands, first, as representative of the government, to see that these highways are in fact public. It is commanded to enforce the provisions of the act to regulate commerce. It must see that rates are reasonable and just; that the practices and regulations of railways are not oppressive; that the penalties provided by the act are enforced. In the near future its powers must be extended to the operation of the railway as well. These duties are largely executive. They can best be discharged by a single head responsible to the executive and answerable to the spur of public criticism.
>
> "Second, this commission is in essence a judicial tribunal which hears and decides complaints. The qualifications of such a body are the exact opposite of the other. Its membership should be numerous, so that its decisions may be the resultant of independent minds. It should be entirely withdrawn from all political and personal influences, and it should have time for the deliberate consideration of the matters coming before it.
>
> "I very much doubt whether the same body can properly discharge both these functions. In the end it will either become remiss in its executive duties or will, in the zeal of those, become unfit for the dispassionate performance of its judicial functions. Whatever may have been true in the past, the time has come when the commission should be relieved of all its duties except the hearing and deciding of complaints."

It is not humanly possible for the same man in the same case to be both a zealous prosecutor and a just judge. This principle is generally recognized by our state and national governments except in the organization of railway commissions. It seems obvious that both the state and national governments should transfer to the various departments of justice or to bureaus especially established for that purpose the collecting of evidence and the prosecution of complaints against railways, and should leave the various railway commissions to hear and pass on these complaints. The offenses committed by railways would then be more surely detected and vigorously prosecuted, and the bias necessarily resulting from the previous exercise of the functions of the detective and the prosecuting attorney would not influence the decisions of the commissions. If Congress should set a good example in this respect perhaps the state legislatures might follow it.

The personnel of the various commissions is even more defective than the laws that they administer. A large majority of the complaints that they hear and of the rulings and orders that they make relate to traffic matters. Yet the Interstate Commerce Commission has no member who ever had any practical experience in the traffic department of a railway or of an industrial concern, and only one of the state commissions has a member who ever had such experience. The English Railway and Canal Commission act requires that one member of the commission shall be "of experience in railway business." The commission contains two lay members, to whom are added, when it is sitting in Scotland, a Scotch judge; when it is sitting in Ireland, an Irish judge, and when it is sitting in England, an English judge. Consequently, the railway member is always one-third of the commission, and his expert knowledge is always available to it. Furthermore, the tenure of the lay members depends entirely on good behavior, which gives them plenty of time both to get and use knowledge of railway matters. The lack of practical knowledge of traffic matters on the part of the interstate commission has caused the railways an amount of expense and trouble during the past three years of which the public has no conception. In discussing technical traffic matters before it traffic men necessarily have used a language that the newer commissioners could not understand, and the commission constantly has issued unpractical orders about traffic matters that it did not understand. The efforts of traffic men to explain technical matters have at times been about as fruitful as would be the attempts of a mechanical engineer to tell a portrait painter how to make a locomotive. The state and federal laws ought to require that one or more members of each commission shall be men of experience in railway matters and that one or more

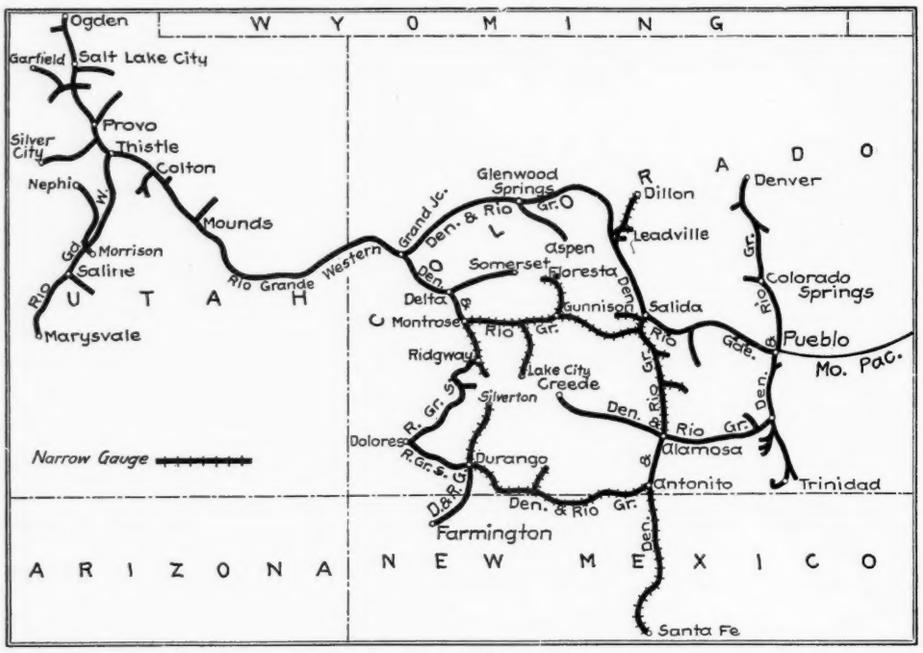
members shall be men of experience in industrial or commercial business. It ought to provide salaries big enough to be attractive to the ablest traffic managers in the country. That all the commissioners ought to contain able lawyers goes without saying, but that the interstate commission should be composed almost entirely of lawyers is an absurdity. The main thing that is needed in fixing just and reasonable rates is a knowledge of rates and the conditions to which they apply. It ought not to be necessary, as it has been in the past, for the railway officers and shippers who appear before the commissions to put in a great part of their time teaching new members elementary matters that they ought to have known long before they were appointed or elected.

No doubt it will be urged once more that the interstate commission should be given power to restrain advances in rates. Until the tendencies in the movements of prices and wages during the new era of prosperity are known it will be impossible to know what changes in rates will be economically justifiable. Furthermore, no one can tell whether the exercise by the commission of the power of restraining advances in rates would tend more to keep rates from being raised or to keep them from being reduced. If no rates are to be allowed to be raised except after a contest before the commission, the traffic managers of the railways are sure to cease making reductions except where there is a mathematical certainty that reductions will cause so large an increase in traffic as to increase earnings, and the instances where there is such mathematical certainty are very rare. The most effectual way to keep the traffic managers from making reductions in rates that the public needs would be to prevent them from making advances which they think the railways need.

DENVER & RIO GRANDE.

The Denver & Rio Grande Railroad, which crosses more mountains and at higher elevation than any other railway in the world, is one of the most interesting properties in the entire American railway system. This is true for a number of reasons. It is handicapped by heavy grades and by severe falls of snow, while the system includes 787 miles of narrow gage; nearly a third of the entire mileage. Thus the operation of the road is difficult and costly, while, from a strategic standpoint, it is the indispensable link of connection between the newly built Western Pacific, terminating at Salt Lake City, and the main line of the Missouri Pacific, at Pueblo, Colo. Any consideration of the prospects of the road must rest upon its future as part of this new transcontinental system. The Western Pacific is now well along towards completion, and has been built in an excellent and substantial fashion, according to the best practice of the present day, with maximum grades of 52.8 ft., as against 116 ft. eastbound and 106 ft. westbound on the Union-Central Pacific route. It will require skilful management and careful engineering work, however, to prevent this advantage from being thrown away in the rugged country traversed by the Denver & Rio Grande, which crosses the transcontinental divide at Fremont pass, 11,328 ft. high; at Marshall pass, at 10,856 ft., and at Tennessee pass, 10,240 ft. on different lines.

The original financing of the Western Pacific was accomplished by the sale of $50,000,000 5 per cent. Western Pacific first mortgage bonds, secured by a first and closed mortgage on 927 miles of road; by first mortgage on the San Francisco terminals of the company, and by direct guarantee of the Denver & Rio Grande, which owns $50,000,000 of the $75,000,000 capital stock of the Western Pacific. It was originally thought that the proceeds of this issue, amounting to approximately $45,000,000, would be sufficient to build the main line and some feeder branches as well; but the first part of the construction work fell upon times when prices were high and labor was scarce, and engineering difficulties were encountered which were considerably more severe than had been anticipated. Consequently, an additional issue of second-mortgage



Denver & Rio Grande.

bonds was made necessary. The Rio Grande Western, merged with the Denver & Rio Grande Railroad July 27, 1908, has contracted to purchase sufficient second-mortgage bonds of the Western Pacific for the completion of the road; but it would have been difficult, if not impossible, to find an outside market for these bonds at a decent figure. Consequently, on September 10, 1908, at a special meeting, the stockholders of the Denver & Rio Grande Railroad authorized an issue of $150,000,000 first and refunding 5 per cent. bonds, of which $90,000,000 were to be reserved to protect liens then existing. The directors subsequently authorized the issue and sale of $22,944,000 of these first and refunding 5s, of which seven millions were to cover probable requirements of the Denver & Rio Grande while the balance of the issue, $15,944,000, were for the purpose of providing funds for completing the main line of the Western Pacific, the Denver & Rio Grande receiving $17,130,000 face value of Western Pacific second-mortgage bonds in consideration of the funds so used.

Until the completion of the Western Pacific these additional funds are, of course, an additional burden to the Denver & Rio Grande, which now has a funded debt of $102,379,000, or $39,406 per mile, in addition to $83,799,800 of capital stock, which is at the rate of $32,248 a mile, making a total capital of $71,654 per mile.

It was hoped that the Western Pacific would be opened this last summer, but the present estimate is that track laying will be completed early in October, while commercial operations will be commenced as soon as the new track can be made ready for through train service; a process which takes several months. The significant part of this situation is

that the burden which the Denver & Rio Grande has had to carry since the early days of the Western Pacific project, in 1903, ought now to be nearly at an end.

Considering the nature of the territory traversed, the earnings of the Denver & Rio Grande have always been rather remarkable. The total operating revenue for the year ended June 30, 1909, amounted to $20,876,571, a sum within $50,000 of the highest earnings in the history of the company, in 1907, although the 1909 earnings were based upon slightly greater mileage. These earnings are at the rate of $8,238 per mile. Operating expenses, $14,452,574, were at the rate of $5,703 per mile, leaving net operating revenue of $6,423,997, or $2,535 per mile. After providing for taxes and all charges against income, including 5 per cent. on the $45,779,800 preferred stock, and after a contribution of $120,000 to the renewal fund, there remained a surplus from the year's operation of $647,958. Out of this $361,244 was appropriated for additions and betterments and $286,714 was carried forward as a profit and loss surplus. Operating expenses as a whole were high, because the severe retrenchment following the panic of 1907 left the rolling stock in bad condition and unsatisfactory labor conditions made it worse.

The proceeds of the $7,000,000 provided for the uses of the Denver & Rio Grande by the new mortgage will be applied both to fixed charges and to rolling stock. Contracts have been let for 30 locomotives, 4,000 freight cars and 20 passenger cars, which will be ready by the time the Western Pacific is in condition for commercial business.

Forty per cent. of the tonnage of the road in the 1909 year was derived from ore traffic, and 28 per cent. from bituminous coal. The coal, however, brought in a revenue of over 3½ million dollars, as against approximately two million from the ore. Total products of mines, including stone, sand and clay, aggregated 83.67 per cent. of the traffic of the road. Manufactures aggregated 5.54 per cent.; products of agriculture (the largest earnings being derived from fruits) aggregated 3.82 per cent., and lumber 2.39 per cent. It is obvious that when the Western Pacific begins operations the Denver & Rio Grande will receive a greatly increased tonnage of manufactures westbound and of forest products and fruits and vegetables eastbound. At present the Southern Pacific and proprietary companies get approximately one-quarter of their tonnage and a good deal more than quarter of their earnings from manufactures and merchandise, and haul every year a million and a half tons of fruits and vegetables which the Western Pacific-Denver & Rio Grande-Missouri Pacific route ought to be able to compete for quite sharply.

It seems plain, therefore, that the company is turning its corner and that it ought, in the future, to have far greater earnings than it has ever enjoyed in the past. How the business is to be taken care of with the existing track facilities or with track facilities which can be added for a reasonable expenditure, is the great problem of the future for this company. There can be very little doubt that many miles of old railway will have to be thrown away entirely and that many miles more will have to have so much work done on them that they will be, to all intents, new line. But the company is not yet quite at the limit of its present facilities and it will doubtless find some way of taking care of the increased business when the business comes.

The details of maintenance in 1909 were as follows:

Maintenance of way, per mile of single track*....	$944
Repairs, depreciation and renewals, excluding superintendence:	
Per locomotive†.	3,312
Per passenger train car†.....	533
Per freight train car.†.....	80

*This statement excludes switches and sidings in calculating the mileage, since the company does not list them. Of the total single track mileage, 787 miles was narrow gage in 1909.

†Standard gage locomotives.....	438
Narrow gage locomotives	112
Standard gage freight cars	11,831
Narrow gage freight cars.....	3,649
Standard gage passenger cars.....	246
Narrow gage passenger cars.....	125

Operating details compare as follows:

	1909.	1908.
Average mileage operated	2,534	2,499
Freight revenue	$15,163,254	$14,369,567
Passenger revenue	4,784,418	5,119,190
Total operating revenue	20,808,271	20,310,516
Maint. way and structures.	2,530,109	2,174,917
Maint. of equipment	3,572,326	3,048,456
Traffic	467,269	444,588
Transportation	7,294,231	6,728,869
Total operating expenses.....	14,452,574	12,925,306
Taxes	762,824	750,471
Operating income	5,704,712	6,753,508
Gross corporate income.....	6,686,751	7,307,804
Net corporate income	3,056,948	3,535,836
Dividends	2,288,990	2,288,070
Surplus	767,958	1,247,766

MISSOURI, KANSAS & TEXAS.

The growth of the West in population and in resources is illustrated in a very striking fashion by the history of the Missouri, Kansas & Texas Railway. Running southwest from St. Louis and Kansas City, with a port at Galveston, it not only reaches excellent agricultural country, but has had the geographical means of getting a decent division on the traffic it originated. For a long series of years it earned between $5,000 and $6,000 a mile gross, and operated for about 71 per cent. without substantial change either in the kind of business done or in the earnings from it. In 1897 28 per cent. of the total tonnage of the road was coal,

Missouri, Kansas & Texas.

20 per cent. was grain, and 13 per cent. was live stock; the average ton-mile rate had declined to 8.9 mills and interest and rentals absorbed $149,353 more than the total net income. In 1909, however, coal furnished 32 per cent. of the total tonnage, while the balance was thoroughly well distributed, manufactures and merchandise contributing 18 per cent.; lumber, 9¾ per cent.; live stock, 6⅓ per cent.; grain, 5¾ per cent., and cotton, 4 per cent. The average ton-mile revenue was 1.04 cents on account of the increase in high-

grade commodities carried; the road earned $8,236 a mile gross, and earned twice its preferred stock dividends after liberal appropriations out of income for additions and betterments.

Owing to the conditions of its growth the Missouri, Kansas & Texas has always had a considerable load of capital to carry, and this fact in former years proved a serious obstacle to any constructive campaign of betterment work. In 1897 the funded debt in the hands of the public was at the rate of approximately $33,000 a mile; there was capital stock outstanding at the rate of over $31,000 a mile, and the physical condition of the property was bad. Gross earnings were $600 per mile less than they were in 1892, owing to the general tendency of rates downward, and the company was confronted with the necessity of putting itself in condition to make money at the new level of rates without having good credit for the expenditures which were imperative.

The history of the improvement work has had nothing sensational about it. Where the company had a chance to sell bonds, it has done so; where the net earnings have been good, they have been turned back into the property in greater or less degree, while steel bridges have gradually replaced wooden ones, heavy rail light sections, and the road has been ballasted and supplied with proper equipment. Meantime the growth of Kansas, Oklahoma and Texas has been phenomenal, with the result that the Missouri, Kansas & Texas has found itself the short line to distributing points of importance, such as Oklahoma City, and has had a heavy and increasing movement of high-class commodities carrying relatively high rates. As a result, gross earnings rose to $26,183,959 in 1907, at the rate of $8,523 per mile for the 3,072 miles in operation.

Year after year the president has emphasized the importance of spending new funds in order to be able to operate cheaply, and to control the business of profitable territory before it should fall into other hands. It may fairly be said that the road now accomplishes this. The total bonded debt is still relatively high ($36,549 per mile), but the total capital per mile is less than it was 12 years ago, and there is no longer any question of the ability of the road to earn its charges in good times and bad.

The company operates in the territory where railway legislation has run rampant during the last few years. Its average passenger rate is now exactly two cents a mile, and it is convinced that it is losing money on that basis. Federal and state laws limiting hours of labor also necessitated buying land, building new yards, and providing other accommodations at a number of places, as well as enlarging existing facilities. The company has made heavy improvements during the year, but the president still emphasizes the urgent need for reducing grades, revising the line, building new division terminals, finishing laying the main line with 85-lb. rails, etc. It is the intention of the company to do this work entirely out of income, confining the issue of bonds to the acquisition of new property.

For several years the company has been confronted by an awkward situation with respect to terminals at St. Louis, and has now organized the Missouri, Kansas & Texas Terminal Company of St. Louis, which has acquired the only remaining tract of land in northern St. Louis suitable for railway purposes, on which freight yards and terminals will be established, the total cost of the project being in the neighborhood of $4,000,000. The terminal company will issue bonds for this purpose, guaranteed by the Missouri, Kansas & Texas Railway.

The president reports that the extremely hostile attitude towards railways in the district traversed has been greatly modified during the past year, and that, although the hostile laws of 1906, 1907 and 1908 have been allowed to stand on the books, no especially objectionable laws have been passed at the recent sessions of the legislatures.

The principal details of operation in 1909 and in 1908 compare as follows:

	1909.	1908.
Average mileage operated....	3,072	3,072
Freight revenue	$16,852,840	$15,400,006
Pasenger revenue	6,964,089	6,343,935
Total operating revenue	25,300,915	23,283,670
Maint. way and structures.	3,370,150	3,027,005
Maint. of equipment.....	3,379,083	3,049,670
Traffic	587,451	598,655
Transportation	9,496,854	9,015,855
Total operating expenses.....	17,667,406	16,432,108
Taxes	967,309	688,243
Operating income	6,666,200	6,163,319
Gross income	6,847,635	6,544,742
Additns and bettermts (Texas)	433,412	546,444
Surplus	940,884	788,830
Dividends	520,000	520,000
Balance forward	420,884	268,830

NEW PUBLICATIONS.

Depreciated Currency and Diminished Railway Rates. An inquiry to ascertain the opinions of leading economists and publicists concerning the propriety of an adjustment of railway rates to the diminished value of the money in which they are paid. Published by the *Railway World*, Philadelphia, Pa. 127 pages; 5½ x 9 in.; paper.

This is a very interesting collection of opinions, which demonstrate conclusively that the advance in railway rates during the last four or five years has been less than the advance in general prices and the wages of those who pay railway rates, so that railway rates have actually declined, when measured by the only accurate standard; that of purchasing power.

The New Building Estimator. By William Arthur. David Williams Co., New York. 424 pages, 4¾ x 6¾ in.; 14 illustrations; cloth. Price, $2.50.

The author is a builder of Omaha, Neb., whose work has been in many cities of the Middle West. The present book is a fifth, revised and enlarged edition of "The Building Estimator," first published in 1904. As the title page states it is "a practical guide to estimating the cost of labor and materials in building construction from excavation to finish," and is a useful handbook for contractors, architects, engineers, appraisers, insurance adjusters and others interested in the detailed cost of buildings. Part I includes an introduction and about 30 pages on approximate estimating, and Part II, detailed estimating, divided into 29 chapters, of which 20 are on various classes of work and the others on miscellaneous subjects. There is an excellent index at the end, and illustrations of 14 buildings constructed by the author and frequently referred to; otherwise the text is not illustrated. There are numerous tables, including mensuration, weights of lead and cast iron pipe, flat, round and square iron, bolts, lag screws, rivets, galvanized, corrugated and black sheets, copper rods, metals, substances, doors, columns, porch newels, mantels, stair work, lumber and flooring; also tables of capacity of round and rectangular tanks, lumber reckoning, and of wages.

The book contains an enormous amount of information, but from the nature of the subject, it must be used with a knowledge of local conditions and the work in hand. Many of the details estimated show wide margins of cost and the application of the information must be with judgment. The author's experience with structural iron and steel has evidently not been extensive and he avoids the interesting question of the estimating of an important steel frame by the statement that "the weight of all structural iron and steel is marked on the plans so that there is no difficulty in getting the total." This omission, however, may not be severely criticized, as many structural shops are lacking in accurate knowledge of the cost of various classes of shop work. On heavy and complicated work a contract is invariably let to a steel shop and generally at a lump sum. A discussion of the methods of estimating weights could with advantage be shown as a means of checking weights and a most necessary one for a pound price job.

Chapters XXII and XXIII are of special interest to railway men. The former refers to all classes of railway buildings,

giving cost per square foot of ground area and per cubic foot for buildings, and in the case of shops also for tools and miscellaneous equipment, together with some brief description of the building and location; included are 9 power plants, 9 erecting and machine, 6 boiler and tank, 12 smith, 6 passenger car repair, 10 passenger car paint, 3 freight car repair shops, 9 planing mills, 5 storehouses, 4 oil houses, 19 roundhouses with cost per stall, etc.

Chapter XXIII goes much into the detail of engine houses.

The book is compact and of convenient size but could with advantage be bound in flexible leather; the typography is clear although many original abbreviations are used which require the explanation given. Following out a simile of the author's, there is a mine of ore much of which is rich and in which many will find valuable nuggets. There are some modest gems of humor and philosophy which enliven the test, spice the cautions given, and speak not unkindly of the man. To those who have occasion to consider the details of building construction the book will be of much value.

Letters to the Editor.

SYSTEMATIC SIGNALING.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

I am taking advantage of your kind permission to send you some comments on Mr. Anthony's article on Signaling which appeared September 10 [page 456]. Because there is so much reference to the work of the joint committee of the Maintenance of Way and Signaling Associations I have ventured to go rather deeply into this from the standpoint of a very substantial minority representing over 30,000 miles of railway.

There is no doubt that the general requirements that a given "aspect" shall always mean the same thing to the engineman, and that the same "indication" shall be given by the same aspect, are good. They form the only basis on which a uniform system should be designed. It will be interesting to note whether these requirements have been adhered to when the final report is made by the committee mentioned.

It is doubtful whether the statement that the code provides six signal indications is true. It deals with three different kinds of installations, and while arranging for rules to cover the different conditions which arise it apparently provides different caution indications.

Strict examination, however, shows that with the exception of the indication for a three-position signal at 45 deg. in automatic territory the caution indications are the same, ("Proceed with caution"); the only difference being that, in the case of the manual block and interlocking distant signals, the limits of the caution indication are defined, and in the case of manual block and interlocking home signals they are not defined. The action required, however, is the same and, therefore, the code contains only four indications, as follows:

Stop.
Proceed with caution.
Approach next signal prepared to stop.
Proceed.

A study of the indications provided in "Systematic Signaling" will show that "Proceed at normal speed—prepare to stop at next signal," has been substituted for (a) "Proceed with caution to the home signal," (b) "Proceed with caution to the home (or advance) signal," and (c) "Approach next home signal prepared to stop."

The scheme then (which, it can be assumed, of course, is the scheme to be recommended at the Signal Association annual meeting) apparently makes its own selection, which agrees, partially, with only one of the caution indications given by the code. The code does not mention "Proceed" or "Proceed at normal speed" in connection with a caution indication.

All of which is of very little consequence except to show that the code had very little to do with the scheme suggested.

The necessity for three kinds of "stops" is doubtful. "Stop until authorized to proceed" can be changed to "Stop." The engineman has nothing to do but wait for authority by fixed signal, hand signal or written order to "Proceed." "Stop and proceed" is contradictory and really means "Stop." The engineman receives his authority to "Proceed," after stopping, from some special mark placed on the signal for that purpose.

"Stop and investigate" is unnecessary. All stops should be investigated, and in many instances the indication given by a switch marker when a switch is set for a side track or junction does not require a stop. The switch marker may be red and, according to the scheme suggested, may be indicating "Stop and investigate," and yet a train entering the side track or junction need not stop.

While on this subject it might be well to call attention to the fact that a switch marker should not be treated as a signal in the sense that it is to indicate some action for the control of a train. This action should always be indicated before the switch is reached, and the switch marker should only be used as a route indicator.

With this idea in view the use of "Continue" as an indication for a switch marker when a switch is set for main line is objected to.

If a "Station closed" indicator is provided with an indication "Continue," it should be required that every engineman should receive this indication before passing a station where it is displayed. If this is done and lights are out the train must stop, without any provision being made for starting it again, and this at a place where, if lights go out, there is no one to relight them.

As a matter of fact, trains are now being kept constantly notified about closed stations and the necessity for a "Closed station" indicator is doubtful. If it is provided, for the convenience of trainmen in checking their previously received notices, it should simply mean "Station closed" and not be provided with any indication.

The proceed indications given are as follows:

6. Proceed at normal speed.
7. Proceed at normal speed—prepare to stop at next signal.
8. Proceed at normal speed—prepare to pass next signal at normal speed.
9. Proceed at normal speed—prepare to pass next signal at limited speed.
10. Proceed at limited speed.
11. Proceed at limited speed—prepare to stop at next signal.
12. Proceed at limited speed—prepare to pass next signal at normal speed.
13. Proceed at low speed.
14. Proceed at low speed—prepare to stop.

An examination of these indications shows that all but No. 14 are necessary if, in the main, they are right. If it is consistent to indicate any action which is required at the next signal every action which can be required must be indicated. If "Prepare to stop at next signal" and "Prepare to pass next signal at limited speed" are indicated, the indication "Prepare to pass next signal at normal speed" is compulsory, both in connection with a normal speed and a limited speed movement. None but No. 14 should be eliminated, and it would be interesting to inquire whether the physical difficulties in providing these indications with the scheme of aspects hinted at has not had something to do with their suggested elimination.

Many practical men have held and still hold that it is bad practice, to say the least, to indicate to the engineman what action is required at the next signal; that each signal should be read and acted upon as it is reached, so that the maximum protection may be obtained by requiring the engineman to

keep on the lookout to note what indication the next signal is giving.

Many, again, hold that the only fair scheme of signals is one that only demands of the engineman a literal obedience of a command issued by the indication, and leaves nothing for him to do but control his train from one signal to the next in the way he is told to control it; that the railway should assume the responsibility of telling him by indication how far he can run at normal speed, when and where to reduce speed, and when and where to stop.

The indications proposed do not do this. "Proceed at normal speed—prepare to stop at next signal" assumes that the block is clear, but the next signal is too far away to require a fast train to reduce speed at once in order to stop at next signal. The enginemen are told then to "proceed at normal speed" and each one for himself must pick out some local mark where it is necessary for his special class of train to reduce speed to stop at next signal. Nothing definite, no responsibility assumed and the enginemen left to their own devices to make time but still to stop at the next signal.

Similar arguments apply to all the other normal and limited speed indications whenever information is given about the next signal; if any benefit is to be derived by the railway the engineman must assume the responsibility of knowing where it is safe to cease acting on the indication given by the last signal that he passed and take up the indication given by the next signal.

With signals located properly with reference to the indications given and the tracks they signal over, no information need be given about the next signal; the commands should be issued, directly, from the last signal passed, to run at normal speed, to reduce speed or to stop.

No matter how carefully signals are designed, every adverse condition cannot be protected against, and it will always be necessary for the enginemen or someone else on the train to keep a sharp lookout. If they are not doing this they cannot be told to do so by signal, because they will not see the signal.

Applying this principle to the indications "Proceed at low speed" and "Proceed at low speed—prepare to stop," it would appear that only one is required, since a train running at ten miles an hour, as required by these indications, can be stopped anywhere and, as previously stated, the engineman should not be asked to increase the speed of the train until the signal is reached which tells him it is safe to do this.

The true historical facts about the introduction of speed signaling into the reports made to the different societies are as follows:

In 1905 Mr. Mock reported to the American Railway Engineering and M. W. association in connection with interlocking signals:

> "That inasmuch as interlocking signal plants were introduced to make the passage of trains safe at speed over track layouts more or less complicated by crossovers, turnouts, and crossings, the object in arranging interlocking signals is primarily to indicate routes for trains, and secondarily, as a necessary consequence, speeds for trains."

This applied to interlocking signals only and was simply a convenient way of selecting routes.

In 1907 to the signal association and in 1908 to the M. W. association the present committee reported:

> "It is therefore the conclusion of the committee that in a system of signaling the aspects should primarily serve to indicate what is required of the engineman in the control of his train, and secondarily, should provide for the giving of certain additional useful information, limited by the reasonable practicability of displaying the necessary aspects, and the added burden upon the engineman's memory that will result from the use of many aspects."

Thus in 1907 was the idea of speed signaling given us, not as applying to interlocking signals alone, as in 1905, but as applying to all signals.

In 1907 the indications designed from the above basic principle had reference to routes, and in 1908 in the report to the signal association the indications were changed, the routes eliminated and the indications given in the article under consideration were accepted.

It will be noted then that here is illustrated one of the very important changes which have been made in the work of this committee. The plan of using the three-arm interlocking signal and having it apply to route, speed or any other signaling has been strictly adhered to. It is stated that the two propositions on which the indications are based are "speed signaling" and "continuity of indication." The first is right, but the second has no place as a basis for indications.

It is purely a question of control of signals. In order to permit a normal speed movement from one signal to the next it is necessary to arrange the control of a given signal so that it cannot indicate normal speed unless the next signal, if it is within braking distance, or closer, is also indicating normal speed; but this last signal may change and require a stop, so that, even by inference, as suggested, the indication should never say that the next signal is indicating normal speed.

Neither have routes any place in a speed signaling scheme. Again it is a question of control. Routes, conditions of block, existence of "31" or "19" orders or not, misplaced switches, signals at stop, etc., are only the changeable conditions which determine whether the engineman shall be permitted to run at his usual speed, be told to control his train and run at some lower speed than usually maintained or be told to stop.

There is not, or, rather, should not be any difference between the action required for the approach to a stop signal or to a train. Both actions should be described by the old railway term "Under control," and the same action, so far as the safety of the train is concerned, would be ample for divergence.

It is true that the aspects which will be shown in the report and which Mr. Anthony refers to were first considered. They were practically decided on before this discussion was made public. This does not make them right. Speed signaling has been introduced and the three-arm interlocking signal will always be a route signal. If it is right to give information about the next signal (this, I repeat, is doubted) the present two-arm home and distant is the proper signal to base aspects on, the lower arm being used solely as a repeater of the position of the next home signal.

The indications presented emphasize some of the poor features which have gradually crept into signaling of late years; the old caution indication which was first used has been done away with and specific reasons for caution given, thus attracting the engineman's attention away from the general supervision of conditions and concentrating his thoughts on some specific thing.

The final report will show that all this is leading us away from American signaling and toward the English form of descriptive signaling, with all its complications.

T. S. STEVENS,
(Signal Engineer, Santa Fe System.)

Contributed Papers.

TRAIN ACCIDENTS IN AUGUST.

Following is a list of the most notable train accidents that occurred on the railways of the United States in the month of August, 1909. This record is intended to include usually only those accidents which result in fatal injury to a passenger or an employee or which are of special interest to operating officers. It is based on accounts published in local daily newspapers, except in the case of accidents of such magnitude that it seems proper to write to the railway manager for details or for confirmation:

TRAIN ACCIDENTS IN THE UNITED STATES IN AUGUST, 1909.[1]

Collisions.

Date.	Road.	Place.	Kind of Accident.	Kind of Train.	No. persons reported Kil'd.	Inj'd.
2.	G. Rap. & Ind.	Kalamazoo.	bc.	P. & Ft.	1	3
8.	Louis. & Nash.	Galloway.	bc.	P. & P.	1	5
8.	P., Ft. W. & C.	Chicago.	xc.	P. & Ft.	0	3
†14.	Den. & Rio. G.	Husted, Colo.	bc.	P. & P.	11	59
19.	Erie	Savona.	rc.	P. & Ft.	1	7
25.	A., T. & S. Fe.	Mojave.	xc.	Ft. & Ft.	12	1
28.	Wabash	Glenwood.	bc.	P. & Ft.	2	20
29.	Grand Tk.	Capac. M.	rc.	P. & Ft.	2	3
30.	G. Rap. & Ind.	Reed City.	bc.	Ft. & Ft.	2	0
30.	Nor. Pac.	Detroit, Minn.	rc.	P. & Ft.	1	10

Derailments.

Date.	Road.	Place.	Cause of derlmt.	Kind of train.	No. persons reported Kil'd.	Inj'd.
2.	C.,C.,C. & St. L.	Bellefontaine.	ms.	Pass.	0	1
3.	Cent. Ga.	Lexsy.	unx.	Pass.	0	10
5.	Louis. & Nash.	Livingston.	d. track.	Pass.	1	0
6.	S. L. & Ogden.	Kaysville.	b. axle.	Pass.	0	5
7.	St. L. & S. F.	Memphis.	loose tire.	Ft.	2	3
8.	Mo. Pacific.	Avondale, Colo.	d. track.	Pass.	0	5
9.	W. & Lake E.	Burbank.	unx.	Pass.	0	5
12.	Southern	Bull's Gap.	unx.	Pass.	0	7
18.	Pere Marq.	Grand Ledge.	boiler.	Pass.	2	4
21.	St.L.,I.M. & S.	Clearwater.	unx.	Pass.	0	11
*21.	Spokane F. & N.	Dart's.	d. bridge.	Pass.	1	3
21.	Penn.	Youngstown.	unx.	Ft.	1	0

The accident in this list most fatal to passengers was the butting collision at Husted, Col., on the 14th. That at Mojave, on the 25th, caused a larger number of deaths, but none of the victims were passengers. The collision at Husted was between passenger trains No. 1 (second section) southbound and No. 8 northbound, and both were running at full speed. On No. 8 there were two engines, and these, together with the other engine and one baggage car and one smoking car, were badly damaged, one car being completely wrecked. Eight passengers and three employees were killed and 56 passengers and three employees were injured. The trains were heavily loaded, and many passengers were injured in the stampede to escape from the cars. The cause of the collision is attributed to the negligence of the men in charge of train No. 8. This train, going north from Colorado Springs, received orders to meet the first section of No. 1, engine No. 760, at Edgerton, and the second section, engine 767, at Husted, which is the next station north of Edgerton. It appears that the first section of train No. 1 was met at Edgerton, and that there was an empty engine there also, which seems to have been taken for the second section. This engine, however, was running as an extra and carried white signals, and its number was, of course, different from that of the engine on the second section of No. 1.

The collision at Mojave occurred at 4 a.m., and was due to a heavy freight train eluding control on a steep grade. It ran at high speed to the yard, where it collided with a yard switching train. This train is spoken of as belonging to the Southern Pacific, though the runaway belonged to the Atchison, Topeka & Santa Fe. Of the persons killed five were employees; one was a miner and six were trespassers. Of the collision on the 28th the accounts give no light as to the cause; but that on the 30th at Reed City, as well as that on the same road on the 2d, is reported as due to a mistake in giving or understanding telegraphic orders. The butting collision of passenger trains on the 8th is reported as due to a misplaced switch.

In the derailments the most prominent passenger train accidents appear to be those at Grand Ledge, Clearwater and Dart's. At Clearwater the tender was the first vehicle to jump the track, but all of the rest of the train stayed on the rails except the rear car, which was a sleeping car and which was overturned. The failure of the bridge at Dart's is said to have been caused by fire. The engineman could not see the flames in season to stop his train, and it is said that the engine went completely across the bridge before the structure broke down.

[1] Abbreviations and marks used in Accident List:
rc, Rear collision——bc, Butting collision——xc, other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, unexplained——derail, open derailing switch——ms, Misplaced switch——acc. obst., Accidental obstruction——malice, Malicious obstruction of track, etc.——boiler, Explosion of boiler of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (includes empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

Of the 15 electric car accidents reported in the newspapers of the United States in the month of August five are reported as having caused one fatality each. These accidents occurred at Chicago, Youngstown, Pittsburgh (2) and Philadelphia. In the Chicago accident, where a locomotive ran into a street car, the reports indicate four fatal injuries besides the one person killed.

A STAFF OFFICER IN CHARGE OF STATION AGENCIES.*

[The Erie and Ashtabula division of the Pennsylvania Lines is, so far as we know, the only place in the country where the plan herein outlined is pursued, although the development is a natural one and has much to recommend it. We shall welcome correspondence on the subject.—EDITOR.]

Years ago railway officers came to realize that to operate a railway successfully they must have a book of rules for the guidance of the employees; consequently, their intellectual machinery was set in motion, and among the many things that were written is: Each division of a railway shall have a superintendent at the head of it; the employees of each division shall be divided into departments according to the nature of the work in which they are engaged, and the men at the head of each department shall be called staff officers. As these staff officers will have direct supervision of the workings of their departments and the employees in them, they shall be selected on account of certain qualifications, such as executive ability and a general knowledge of the duties of the employees in the department they represent. Consequently, we have the division engineer, who has charge of the railway's property and has supervision over those employed in maintaining it; the trainmaster, who has charge of the movement of the traffic and has supervision over those engaged in this work; the road foreman of engines, who has supervision over the engine forces; the division operator, who has charge of the maintenance of telegraph lines and of train despatching, and has supervision over those engaged in this work, and the master mechanic, who has charge of the shops and has supervision over those engaged therein. But how about the station agencies? Alas, it was decreed that on account of the importance of this department it would not be wise to have it under the supervision of anyone who had any experience in station agency work, nor who was conversant with the duties of the employees, and that no one but a superintendent would be competent to handle it. Therefore, the station agent, unlike his brothers in other departments, has no one who is thoroughly conversant with station agency duties to whom he can tell his tale of woe, but is left to the tender mercies of the chief clerk, who, as a general rule, is well fitted for the position of chief clerk, but has very little knowledge of a station agent's duties.

The station agent is a man with many bosses, who, in fact, is never able exactly to determine which one is his boss. He is, in reality, the railway company's ambassador to the public, whose actions solicit the business; who makes the necessary arrangements to get it started for its destination accompanied by the proper credentials; who collects the money for its transportation, makes the proper records in the archives of the station covering its forwarding and the collecting of the money, and personally sees that this money reaches the coffers of the company. He must be able to read, write and have some knowledge of arithmetic; he must have the patience of Job, and be able at all times to look pleasant, even if his salary is small and his hours long; he must be a diplomat, and must be able to convince the public that it is getting the best of service; much better than it could secure from any competing line, even if passenger trains are late, freight delayed in transit, and the payment for lost and damaged freight

*From a paper read by E. A. Fenton, Division Agent, Penn. Co., at a meeting of the Shenango & Mahoning Valley Transportation Association, Sept. 20, 1909.

not made as promptly as might have been. The station agent must also be able to look into the future so as to advise the traffic department just what the yield of farm crops will be a year hence. It is also necessary that he be able to intelligently interpret the numerous rules, regulations, instructions and general notices which are constantly being received from the general offices, the phraseology of some of these being such as to confuse skilled lawyers. But the agent must make an honest effort not to allow his hands to become tied by the you musts and the you must nots, and he must guide his station in such manner that the business is not shipwrecked on either of these rocks.

In the ranks of the railway army there is no one who has so many departments to satisfy as the station agent; therefore, I do not believe it is possible for any one to advance any good reason why this department should not have the supervision of someone who is wholly conversant with its duties and is ever ready to lend a willing ear and a helping hand to assist the employees in hours of trials and tribulations, and endeavor to bring this department up to the standard its importance warrants.

In order to bring out some of the reasons why there should be a staff officer in charge of station agencies and to show some of the advantages which would result, I have divided into five groups those who are chiefly interested—namely, the public, the division superintendent, the division staff, the general officers and the station agents.

THE PUBLIC.

The success and earning power of a railway depend largely on the attitude of the public towards it, and as the public comes in contact in a business way with the station agent more than with any other railway employee, the gross earnings, consequently, depend more or less on his actions. We have broken away from the practices of the Dark Ages, and the public demands prompt and courteous treatment and is bound to go where it can get it. Therefore, we must have an intelligent, satisfied, fairly paid and properly supervised station force to serve as a magnet to attract and retain business. Is this possible with a chief clerk handling station agencies? It is not. With few exceptions, this railway experience has not fitted him for this line of work, and, further, the station agency department is a side issue with him and he is unable to give it the proper attention. The result is a dissatisfied and inefficient department, which soon becomes fertile soil for the sowing of seeds of anarchy and socialism on account of the great inequality between stations as regards salaries, clerical help, etc. Supervision is entirely lacking, and the chief object is to run the department as cheaply as possible, intelligence and efficiency being lost sight of.

With an intelligent staff officer, who is allowed to be a staff officer in every sense of the word, in charge of this department, conversant with its duties by actual experience, it is possible to obtain results exactly the reverse of the above and have a satisfied and efficient station force, satisfied public and greater gross earnings.

THE DIVISION SUPERINTENDENT.

A successful division superintendent cannot be a Jack of all trades; therefore, it is not expected that he be conversant with the detail workings of all divisional departments, nor is it necessary, as his aides-de-camp, the staff officers, are familiar with the detail workings of their departments and are always in a position to advise him regarding same. However, according to the book of rules, he is short an aide-de-camp, and that for the one department which is likely to cause him more trouble than any of the others, from the fact that it is more closely connected with the public and the general officers than any other department. Therefore, it would be an advantage to a superintendent to have a staff officer in charge of the station agency department.

THE DIVISION STAFF.

No matter how competent a man the division superintendent may be, it is a fact, nevertheless, that the net earnings of a division depend largely on the efforts and team work of the division staff—men who are working for the success of the division as a whole, and not for the success of any particular department and to the detriment of some other department. They should be like the spokes of a wheel, and when it is necessary for the wheel to turn for the good of any one department, or for the good of the division, they, like the spokes, should all turn with the wheel. As I have already stated, a division is divided into six departments; therefore, the division wheel should be constructed to contain six spokes, each representing a staff officer. But as there is no staff officer representing the station agency department, we have a wheel built for six spokes which only contains five. The result is a flat spot, so that everyone who rides is badly jolted, and the five spokes are overtaxed in trying to shoulder the burdens of the missing spoke.

The success of a division depends to a large extent on the rank and file working hand in hand. For example, two of the most important persons are the yardmaster and the freight agent, and if by chance there is friction between these two men and conditions become so bad that both feel they must appeal to their superior officer, the yardmaster writes to the trainmaster and the freight agent writes to the superintendent. What happens? The trainmaster is compelled to discuss the trouble with his superior officer, the superintendent, who more than likely has had no practical experience either in yard or station work, and from the fact that the freight agent has written a very fluent as well as a plausible letter the decision reached is that the yardmaster is at fault. Before long either the yardmaster or freight agent loses his position Why? Because the wheel has a flat spot. With the wheel made complete by the insertion of the missing spoke, how differently the matter would be handled. The freight agent would then write to the staff officer in charge of station agencies, who would compare notes with the trainmaster and both, if necessary, would go to the scene of conflict and adjust the matter. Meantime competitive business, which the traffic department has spent time and money to secure, would be properly handled and retained instead of being driven away.

THE GENERAL OFFICERS.

The advantages to the general officers in having such a staff officer are many, as with proper supervision it is possible to have all stations manned by an adequate force, made up of intelligent and competent men, thereby making it possible to have all rules and regulations carried out, correspondence answered promptly and reports and statements sent in on the day they are due. What is better still, the reports and statements would be correct, and petty mistakes and indifference would be almost eliminated. And, further, the complaints from the patrons of the road which are constantly reaching the general officers relative to treatment received at the hands of the station agency forces would be materially reduced.

THE STATION AGENTS.

To those who have not served an apprenticeship in the station agency department it may seem rather overdrawn when I state that in no other department of a division is there such a vast difference as regards the number of employees and the intelligence required to handle business at one point as compared with another. Nevertheless it is a fact, and the number of employees necessary to handle the business at a station cannot be judged by the size of the town, tonnage handled nor the amount of the business in dollars and cents. Therefore, the station agent ought to have at the head of his department a man who is entirely familiar with the agent's duties and the conditions existing at his station. Notwithstanding the fact that instructions are constantly being issued for the guidance of station agents, such instructions do not educate. What is needed is supervision.

In appointing a staff officer, broken-down men from other departments, or those who have not made good, should not be considered, but the officer should be selected on account of a thorough knowledge of all the details of station work, of

his ability to handle men and to perfect an organization so that men capable of promotion will be attracted to the service of the company. He should have some conception of the amount of work a station employee is capable of turning out in a certain period; his sense of justice should be well developed, and he should be able to impart his knowledge to others. He should be given a suitable title—one that will designate him as something else than a clerk; he should be given the authority the position warrants and not be subservient to the whims of any other staff officer.

GEARED ELECTRICAL FREIGHT LOCOMOTIVE FOR THE NEW YORK, NEW HAVEN & HARTFORD.

The Westinghouse Electric & Manufacturing Company has contracted to build for the New York, New Haven & Hartford an electric freight locomotive of large capacity, for use on the electrified section between Stamford and New York City. The construction of this machine is well under way and the manufacturers expect to have it ready for service in the month of October.

The locomotive has been designed primarily for handling fast freight service, but will also be used for hauling heavy passenger trains. The machine will be placed in regular service by the New Haven road as soon as completed, and given a thorough test in freight service with a view to eventually handling all of this class of work electrically.

The mechanical parts of this locomotive have been designed by the engineers of the Baldwin Locomotive Works and the mechanical department of the New Haven, and are being built at the Philadelphia works of the Baldwin company.

The design includes various features of special interest. The general plan of the trucks and running gear has been worked out in accordance with a patent granted to S. M. Vauclain, July 6, 1909. This patent describes an articulated locomotive in which the truck frames are connected by an intermediate drawbar. One truck has only a rotative motion about its center pin, while the other has a fore-and-aft as well as a rotative motion, in order to compensate for the angular positions of the trucks and drawbar when the locomotive is traversing curves. The tractive force is transmitted through the truck frames and drawbar, instead of through the main frame.

In the present instance, the 2-4-4-2 wheel arrangement has been adopted. Each truck has two pairs of driving wheels, and a single pair of leading wheels. The driving wheels are held in alinement by cast-steel bar frames, similar to those usually used in steam locomotive practice. The frames are placed outside the wheels, and are braced transversely under the center of the locomotive by heavy steel castings provided with draw pockets in which the intermediate drawbar is seated. This bar transmits from one truck frame to the other the full tractive force developed by the motors of the leading truck. Train connections are effected by means of two radial drawbars, one of which is placed at each end of the locomotive. The drawbars are pinned to cast-steel cross-ties, which brace the truck frames between the driving and leading wheels. The latter are mounted in radial-swing trucks of the Rushton type. The radius bars for these trucks are pivoted to the same cross-ties as the main drawbars.

The wheel loads are equalized as in steam locomotive practice, the springs of the leading wheels being connected to the driving springs by equalizing beams. One of the trucks is cross equalized under the center of the locomotive. The frame is spring supported by the cross equalizer, on each side of the center line. This arrangement should promote steady riding, and tends to prevent side rolling at high speed.

The cab is built of steel plate, and measures 43 ft. 6 in. long, covering the entire locomotive. The frame which supports the cab is composed of two 12-in. channels, united at the ends by plates and angles. This frame is braced transversely by five cast-steel cross-ties; one over each truck center pin, one at midlength, and one near each end of the locomotive. The truck center pins carry no weight and, as before explained, one of them is allowed a fore-and-aft as well as a rotative motion.

The cab is supported on the intermediate and end cross-ties, the weight being transferred through coiled springs which are placed in suitable pockets. The cab frame is held in alinement by the truck center pins, while the lower spring pockets are free to slide over the truck-frame cross-ties. The springs over the end cross-ties are placed 30 in. apart, transversely. The middle cross-tie carries four springs; these are placed at the corners of a rectangle and are 84 in. apart, transversely, and 53 in. longitudinally. As both the trucks are free to rotate about their center pins the displacement of the spring pockets, even on a 20-deg. curve, is comparatively slight.

To assist in reducing shocks and keeping the two truck frames in alinement, chafing castings and spring buffers are interposed between the frames, under the center of the locomotive.

The principal dimensions of this locomotive are as follows:

Gage	4t ft. 8½ in.
Driving wheels, outside diameter	63 "
Driving wheels, center diameter	56 "
Driving-axle journals	8 in. x 13 "
Truck wheels, diameter	42 "
Wheel base, rigid	7 ft.
Wheel base, total	38 ft. 6 in.
Length between coupler faces	48 ft.
Height over all	13 ft. 9 "
Width	10 ft.
Approximate weight, total	260,000 lbs.
Approximate weight on driving wheels	188,000 "

It is believed, from experience gained with previous locomotives, that the plan of running gear and cab support adopted for this engine will tend to avoid nosing, promote easy riding and minimize shocks on the track and roadbed.

A characteristic feature of the heavier details is the free use made of cast steel. This is particularly true of the truck frame cross-ties, which are interesting examples of mechanical design. The tendency to follow approved steam locomotive practice is also evident in many of the mechanical details of this locomotive.

The electrical equipment, which is being built and mounted by the Westinghouse Electric & Manufacturing Company, comprises four 350 h.p. single-phase geared motors, together with the necessary auxiliary apparatus for their operation from the 11,000-volt a.c. or 600-volt d.c. circuits of the electrified sections which the locomotive will traverse.

The motors are placed directly over the axles and are mounted solidly on the truck frames. Each end of the armature shaft is provided with a pinion; these mesh with gears mounted on a quill surrounding the axle and carried in bearings on the motor frame, similar to the usual axle bearings. The quills are provided with six driving arms on each end, which project into spaces provided between the spokes in the driving wheels. Each of these arms is connected to an end of a helical spring, the other ends of the spring being connected to the driving wheels.

This arrangement of drive smooths out the torque pulsations, and at the same time allows for vertical movement of the axles. In addition to the spring connection between the quills and drivers, flexibility is provided between the pinions and motor shaft, to equalize the torque on the gears. The quills are of large diameter permitting unrestricted motion of the wheels and axles. The center of gravity of the motors, as well as that of the entire locomotive, is high, avoiding the transmission of strains and shocks from the track and roadbed to the motors.

The motors, of the standard Westinghouse type, have 12 poles built into a solid frame, and are designed for forced ventilation. When operating on 25-cycle a.c. with forced ventilation, each of the four motors will carry continuously a load of 300 h.p. An air-blast transformer is provided for

lowering the trolley line voltage to that required by the motors. The control apparatus is the Westinghouse electro-pneumatic type.

When operating on alternating current, all four motors are connected in multiple, and the control is obtained entirely by changing the connections to various voltage taps on the main transformer. On direct current the motors are first grouped all in series, and then two in series and two in parallel, in combination with various resistance steps. Provision is made for cutting out any one of the four motors singly on either alternating current or direct current.

A master controller and brake valve are located in each end of the cab so that the locomotive can be operated from either end, and the system of control is such that two or more locomotives of this type can be coupled together and operated from one master controller.

Two pneumatically-operated pantagraph trolleys are provided for collecting current from the 11,000-volt overhead alternating-current line. Pneumatically operated third-rail shoes are used to collect current on the direct-current third-rail section.

The locomotive will be capable of hauling a freight train having a maximum weight of 1,500 tons at a speed of 35 miles per hour. When used in passenger service, 800-ton trains will be hauled at a maximum speed of 45 miles per hour.

A steam heater outfit is provided on the locomotive for heating the cars of the trains when used in passenger service.

ROADMASTERS' CONVENTION.

The first day's session of the convention of the Roadmasters' and Maintenance of Way Association was reported in these columns last week. It was decided to hold the next meeting at Chicago in November, 1910.

The report on rail fastenings outlined the history of the development of the rail joint. The discussion of the report developed the general opinion that failure is largely due to loose bolts. Mr. Burke (Erie) thought the question to be one of nut locks. On one crossing where he had had much trouble he has been using the Wolfe nut lock with great success.

In the discussion of the report on ballast it was mentioned that the Pennsylvania, in experimenting with ballast at Altoona, found that a bed made of 24 in. of cinders, compressed to 12 in., and covered with 12 in. of crushed stone, made an ideal roadbed.

The report on tie plates emphasized the necessity of proper application. It recommended the following methods of applying the three common styles of plates:

Flat plates should be put on a perfectly smooth, level surface which will provide a solid foundation for the plate and save the plate as well as the tie and the rail.

Flange plates should have a smooth, level surface prepared to receive the tie plate, this surface to extend four or five inches beyond each end of the plate. The plates should be placed so that the outside shoulder will fit up to the rail and the plate driven down until the flanges are driven down into the tie, leaving no air space between the tie and the plate. This should be done with a tool that straddles the rail and bears evenly on both ends of the plate. This can either be struck with a sledge or with an improvised trip hammer. This style of plate should never be driven by striking the plate directly with a spike maul as it is impossible to sink the plate true in this manner and the plate is also liable to be cracked or bent. Another method that should never under any condition be followed is to tap the plate into place with a spike maul and leave it for the first train to sink, tightening the spikes afterward. When this practice is followed dirt will get under the plate before it is sunk and the plate never does get fully imbedded. This manner of putting in tie plates is very common and more tie plate failures have resulted from this than from any other one cause that has come to our notice. When the tie plate is not properly sunk in, the tie water can get under the plate and the plate bends or cracks, causing the tie to decay around the spikes and flanges and offering no protection to the tie by the defective plate.

The claw pattern plate, being simply a flat bottom plate with claws on the under surface, should have the same surface for applying that we would have for a flat bottom plate. It should be applied the same as a flange plate, using more care, if anything, to see that the plate is driven down evenly than the flange plate, on account of not having the long flanges underneath to add surface strength to the plate and resist bending when being driven.

The following recommendations apply to all kinds of tie plates:

All tie plates should be put in on ties that are equally tamped and of an even height with reference to the rail.

Before selecting tie plates for any track the engineers should consider the track and the ties in the track and select the tie plates for the track in question according to the merits of the different plates and not attempt to make all plates on the road conform to a given standard regardless of the conditions.

All tie plates should be applied as instructed by the designers unless some improvement can be made.

All tie plates should be provided with four holes in order to avoid making pairs that are liable to be separated. The holes should be punched so that spikes will press tight against the base of the rail, but not tight enough to cause the spike to enter the wood slanting.

Tie plates should not be put on until the track is in perfect alinement.

Screw spikes should be used with all tie plates.

Mr. Curtis (Boston & Maine) was asked to give a description of the machine used by the B. & M. to put the tie plate on the tie before the tie is put into the track. This machine is mounted on a car and requires but five men to operate it. This force puts tie plates on 600 ties a day. On the same car is mounted a planer that prepares a surface on the tie for the plate. The essential feature of the operation consists in driving down the plate with one blow so distributed over its surface that no part takes an excess strain. The plates are set to gage before being driven. The B. & M. finds that a cedar tie protected by a tie plate will last 12 years. It uses the Goldie plate on all curves and on straight track where soft wood ties are used. It has found that a ¼-in. plate properly applied will give excellent service, but it is now using ⅜-in. plates. Mr. Burke (Erie) preferred the shoulder plate to the smooth plate and would apply them on all curves and where there is heavy traffic. Mr. Single would place a plate with a shoulder on all ties on all curves. Mr. Sweeney agreed with Mr. Single and would also place them on straight track where soft ties are used.

In the paragraph recommending screw spikes there was cause for disagreement and the paper was finally adopted as expressing the sense of the meeting with that paragraph eliminated. A screw spike driving machine now at work on the Atchison, Topeka & Santa Fe was described. This was designed by one of the officials of that road. It sets 400 screw spikes an hour. Among the objections to screw spikes it was urged that they hold the track too tight. On frozen track, where the tie is held solid, the rail, having no chance to move, will take off the spike head.

The following list of exhibits is in addition to that published last week:

American Hoist & Derrick Co., St. Paul, Minn.—Moving pictures of ditcher in operation. Represented by F. J. Johnson and W. L. Manson.

Railway Specialty & Supply Co., Chicago.—P. & M. rail anchor and the Arctic water box. Represented by P. W. Moore and L. W. Kent.

Scully Steel & Iron Co., Chicago.—Simplex jacks. Represented by R. H. Hyland.

U. S. Metal & Manufacturing Co., New York.—Wolfe automatic rail-joint lock. Represented by John Wolfe.

THE HUDSON AND MANHATTAN TUNNEL SYSTEM.

II.

BY J. VIPOND DAVIES.

During the most active period of construction the work was divided into five divisions, each in charge of a works manager These divisions were as follows:

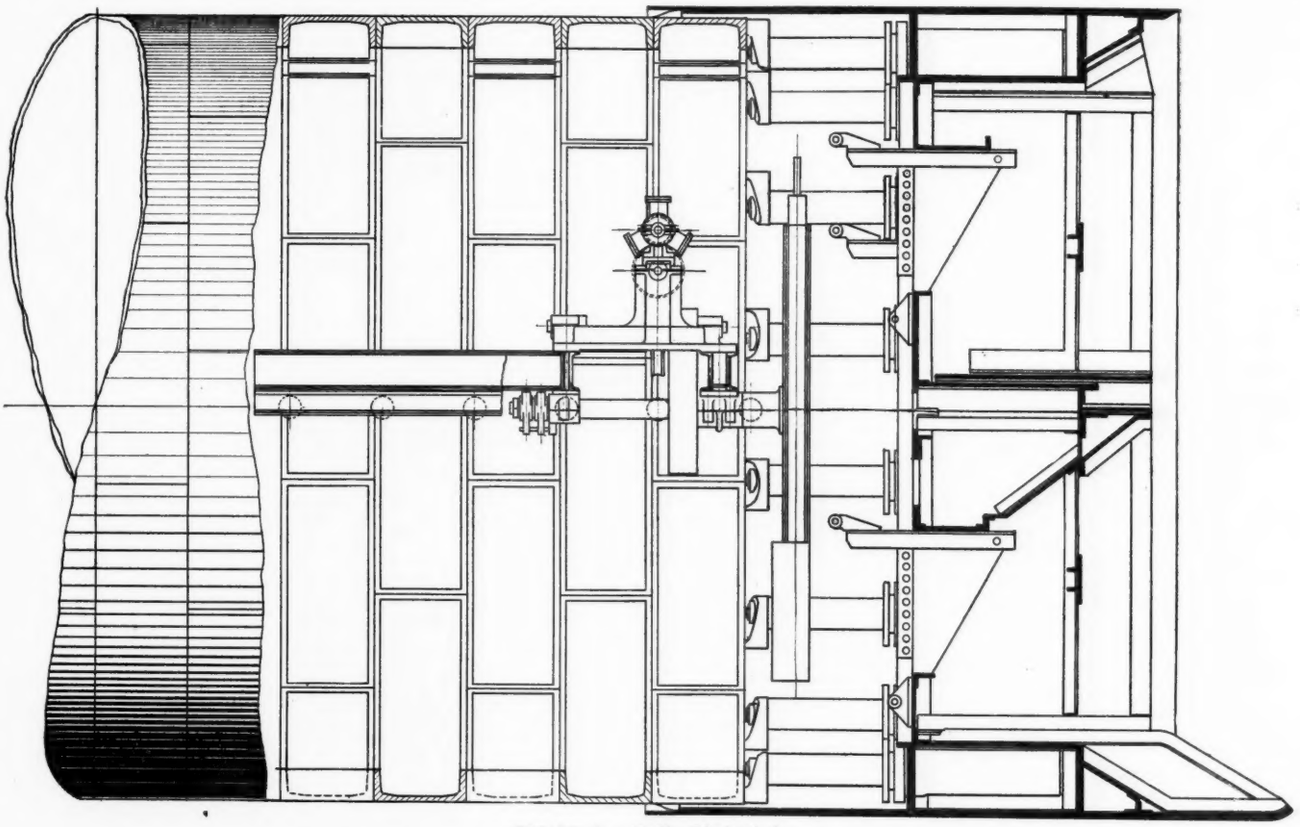
(a) The work in New York City, uptown.

(b) The work in Hoboken, carried on from Fifteenth street shaft, including the work at the Hoboken terminal, the uptown river tunnels and the junction enlargements located in Hoboken and in the northerly part of Jersey City.

(c) The tunnels in Washington street, Jersey City, north and south, executed from Washington street plant.

(d) The work at Jersey city, downtown, involving the river tunnels, the Pennsylvania station, Railroad avenue extension from works centered at Pier C shaft.

(e) The Church street terminal construction and the downtown New York tunnels from the works centered in Dey street and at the site of the Church street terminal.



Shield in Soft Material.

During the period of greatest activity the company had as many as 8,400 men employed at one time.

All work executed under air pressure was under the supervision of the medical staff in charge of Dr. A. J. Loomis, chief medical officer, with three assistants, located at suitable points on the works. The medical staff examined every man applying for work under air pressure, and no men were engaged for this class of work without a certificate from the medical department to the effect that they were physically suitable for such work. The construction department, as far as possible, faithfully regarded the examinations and reports of the medical staff and to this fact is attributable in a great measure the entire absence of difficulties from caisson disease. On the construction work carried out under air pressure the medical staff examined and passed 29,000 men for work in pressure over 20 lbs. and 10,400 men for work in pressure under 20 lbs.

At central stations, where the assistant medical officers were resident on the work, a hospital air lock was equipped at each station, with dressing room and all provisions and appliances for rendering first aid to sick and injured, and the hours of the assistant medical officers were arranged so that at least one assistant was on the work at all hours of the day and night.

TUNNEL CONSTRUCTION.

In laying out the lines adopted by the company for construction, the general principle of tube construction was adhered to throughout. As before stated, the cars designed for operation with the necessary clearances required a circular tube having a diameter of 15 ft. 3 in. inside, and in such sections of the work where concrete lining was used the same general diameter and section were adhered to. In the case of the subway construction in Sixth avenue, while the two tracks were constructed together the same general type was adhered to by the construction of a central dividing wall and giving to it an arch roof corresponding closely to the section provided by the circular tube. This same general section was also followed in the construction of stations, so as to make the design harmonize with the tube construction, and the stations wherever possible were built in arches, and, where feasible, the arches were groined, giving not only a pleasing form of construction, but one which reduces maintenance costs to a minimum and is at the same time structurally the strongest possible section.

The work of construction along these lines has, owing to the geological conditions, involved almost every possible combination of underground construction. Comparatively little of the work has been in solid rock formation, the greater portion being either in soft ground or under conditions of partial rock bottom overlaid by soft ground.

The construction of the river tunnels, both uptown and downtown, has been very similar. The original tunnel constructed partly by the earlier companies was completed of the same diameter as the earlier construction; that is to say, the west-

bound tunnel was continued all the way from Jersey City to the shaft at the foot of Morton street, New York, lined with iron 18 ft. 2 in. inside diameter. The shield with which this tunnel was constructed was in place in the tunnel when the work was taken over by the present company, and, with modifications of construction, this shield was made adaptable for continuing the work with lining of the diameter mentioned; avoiding the necessity of reconstruction of a shield entirely for this tunnel.

After this tunnel was completed, however, of the size stated above, it was lined internally with concrete to the same internal diameter as the other tunnels throughout, and in that way a great many of the irregularities in the earlier construction were straightened out and adjusted. With this exception, all the other tunnels, as before stated, have been constructed of the same general size.

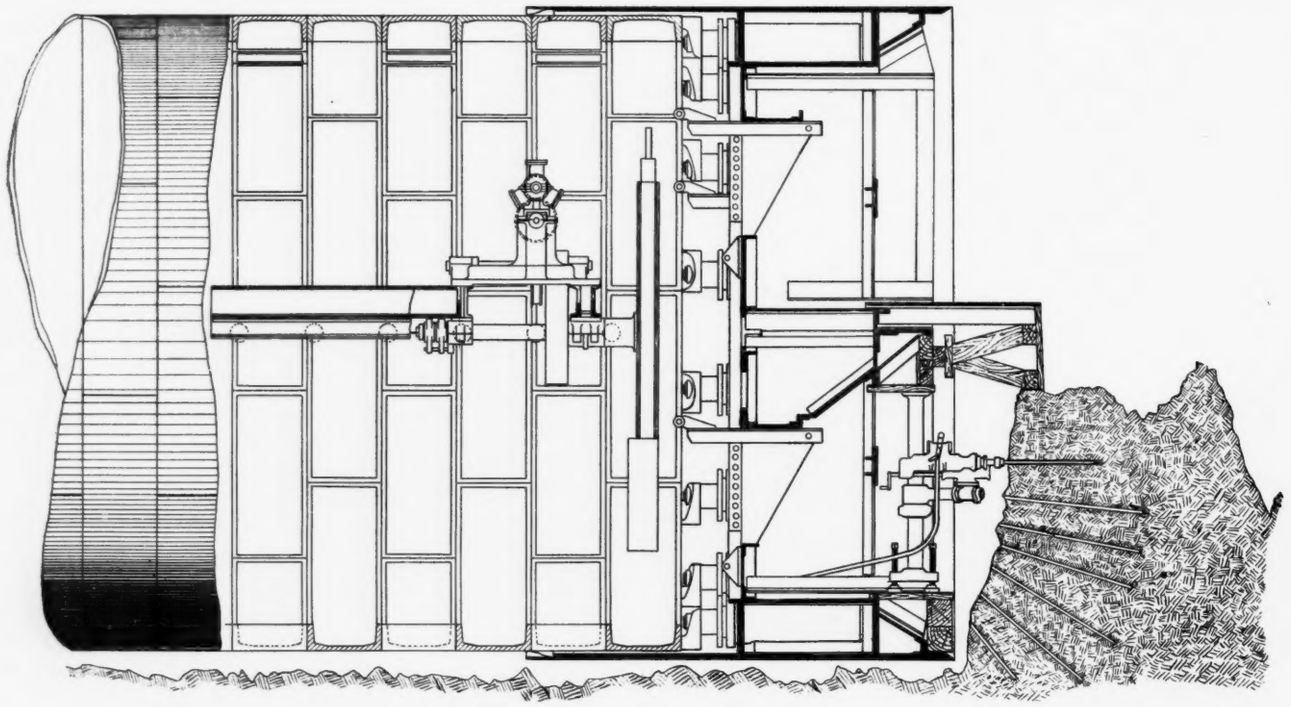
For all the remaining river tunnels, hydraulic shields were designed for the peculiar conditions under which they were to be used, but these shields have been practically similar in design throughout. They consist of an external shell, the front end of which is shod with heavy steel cutting edge castings in segments, and the tail end of the shield overlaps and telescopes outside the plate lining of the finished tunnel as the lining is erected and the shield advances. Each shield is equipped with 16 hydraulic jacks, each jack 8 in. in diameter by 30-in. stroke, which allows for the erection of the lining in 24-in. rings with a little additional margin for clearance. The jacks are operated from blocks of valves dividing the shield into quadrants, and in such a manner that any one or more jacks may be operated independently or collectively.

Generally speaking, the erectors for the erection of the lining plates were operated independently of the shields, using pneumatic engines for rotating the erector and a hydraulic ram for the lifting operation.

The hydraulic power installed for the operation of the shields was designed for working at the maximum working pressure of 5,000 lbs. per square inch, and the shields were designed of strength sufficient to operate under this pressure. The great strength of the shields as designed enabled them to be advanced through the silt formation of the bed of the Hudson river practically without admitting any silt into the tunnels for removal, which enabled record time in tunnel construction to be made. This was carried to such an extent that as much as 72 ft. of finished tunnel has been constructed in a single day of 24 hours in one heading.

All work under the river was carried on under air pressure throughout, this pressure varying according to the depth at which work was executed and also according to the conditions of the soil, but the highest pressure used was 48 lbs. per square inch above the normal atmospheric pressure; this high pressure being used for a very short period only, and usually the pressure did not exceed 35 lbs. per square inch.

The usual arrangement of the air locks installed was to erect two standard material air locks side by side, these locks being large enough at the doors to permit the passage of iron dump cars of narrow gage, with a capacity of one cubic yd., and the locks were of length sufficient to permit of locking through three of these cars at one time. The material locks were placed at a low elevation in the tunnels to permit of extending a single, narrow gage construction track through each lock, and these tracks were fitted with scissors crossings at the ends of the locks to permit of the use of the locks in both directions.



Shield in Soft Material Overlying Rock.

An emergency lock was installed in the bulkhead over the material locks and as high in the tunnel as possible. These locks were of diameter sufficient to enable a man to sit in a comfortable position and were long enough to receive a gang of about 15 men at once.

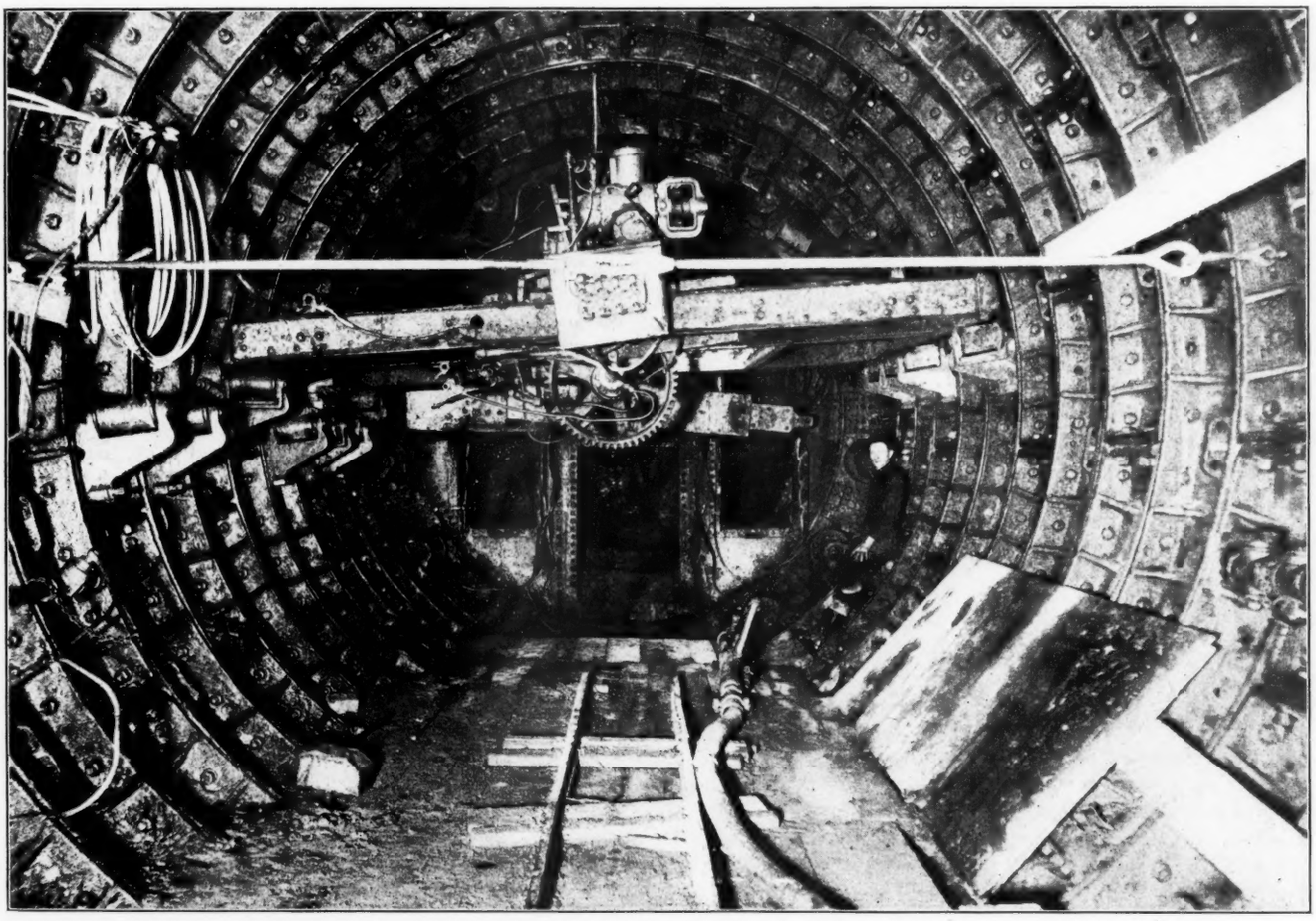
The groups of air locks constructed in the tunnels were in every case installed in concrete walls, or bulkheads, from 3 to 4 ft. thick, and the locks were fitted with thrust rings on the outside to resist the air pressure and to hold the locks in place.

In addition to the material and emergency locks, each air bulkhead was also fitted with a pipe lock approximately 35 ft. long and about 18 in. in diameter, with a flap valve on the pressure side and a gate valve on the external side, through which were handled long pipes, rails, timbers, etc., which would not pass through the material locks.

In all cases of tunnel work being carried on, when the pressure exceeded 20 lbs. per square in. for regular operating use, as in the river sections, double air bulkheads were in-

stalled so as to make two stages of pressure, making decompression easier for the employees, and reducing very greatly the risks attendant upon coming out of air pressure rapidly.

The iron lining used in the construction of all tunnels has been maintained at the same weight throughout, owing to the fact that all this work is below sea level, and with considerable water pressure upon the same. Each iron segmental plate lining ring consists of 9 segments of equal length with a key plate for the closure, the key having the same length as the pitch centers of the bolts. The plates are flanged on all sides, forming a series of circumferential joints and connected together by longitudinal joints, all joints being machine surfaced each complete ring of plates is connected to the preceding ring by 55 bolts and there are 3 bolts in each segmental joint. The bolts are 1¼ in. in diameter and were made with cold rolled threads.



Rear View of Shield.

Generally speaking, the longitudinal joints were staggered by placing the key in different positions so as to break the continuity of the longitudinal joints and to give greater rigidity to the finished construction.

Errors in alinement occurring in the construction of the tunnels were corrected at each advance of the shield, according to instrumental observations, by the insertion of taper rings, which enabled the center line of the tunnel to be deflected, horizontally or vertically, and the use of these taper rings further enabled the tunnels to be constructed on curves where curvature is necessary for the alinement; a record, in this respect, having been made in driving the tunnels on approximately a 150-ft. radius curve from Morton street into Greenwich street and from Greenwich street into Christopher street, where the tubes have been constructed accurately to the curvature required by the use of taper rings made so that the increased distance measured around the external line of the curve corresponds to that of the curvature required.

The segments of plate lining were put in place by the erector with the use of an erecting lug cast in the center of each plate so that the grip of the erector could pick up and balance a plate in order to put it in place. The use of the lug was found to be more convenient and safer in operation than special types of attachments, with which experiments were made.

Considerable difficulty was experienced in all shield-driven tunnels by the rotation of the shields. This occurs notwithstanding all precautions and seems to be attributable to conditions entirely outside of any personal control. The rotation caused little difficulty up to a certain point; after that, definite measures had to be taken to correct the rotating tendencies so the shields would actually be brought back to their normal position, and this was done with complete success.

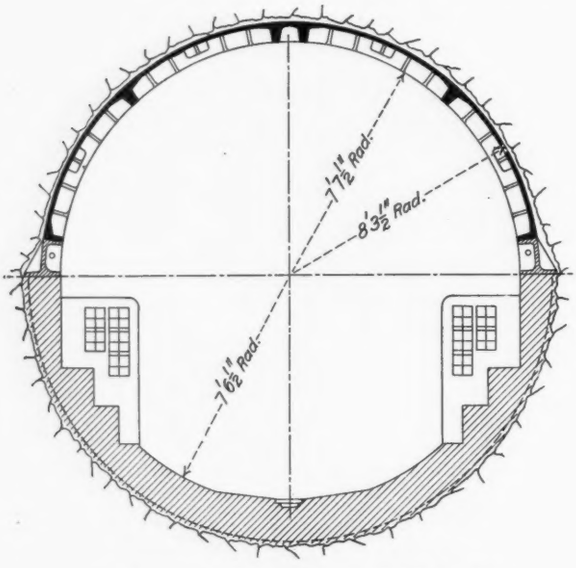
The tunnels under the streets of New York City, both uptown from the river front to Twelfth street and Sixth avenue, and downtown under Cortlandt and Fulton streets, are throughout in formations of sand and gravel of varying character and quality, some of the material being simply New York quicksand. Rock in all these cases lies very near to the grade of the tunnel, and consequently in all this work it comes up irregularly in peaks in front of the tunnel location, thereby necessitating the execution of most of this work with the previous preparation for finding rock foundation with sand and other loose material overlying. The same condition applies equally to the work carried on in New Jersey, where the micaceous gneiss rock underlying the Pennsylvania station disappears below the grade of the tunnels at approximately the Newark line junction on Washington street and going north along Washington street, and while the lower level tunnel continues a considerable distance in rock forma-

tion the higher level tunnel goes out of rock into sand and hardpan formation, which yields quantities of water. A short distance south of Pavonia avenue, Jersey City, the gneiss rock disappears, and when rock is again encountered north of that point it occurs as the red sandstone of the Newark formation. Overlying this rock bed throughout is wet sand and boulder formation. In consequence of these several formations tunnel construction had to be carried on partially in rock and partially in loose ground throughout. The added condition of being below tide level and all the soil being saturated with water also necessitated carrying on all the work under air pressure.

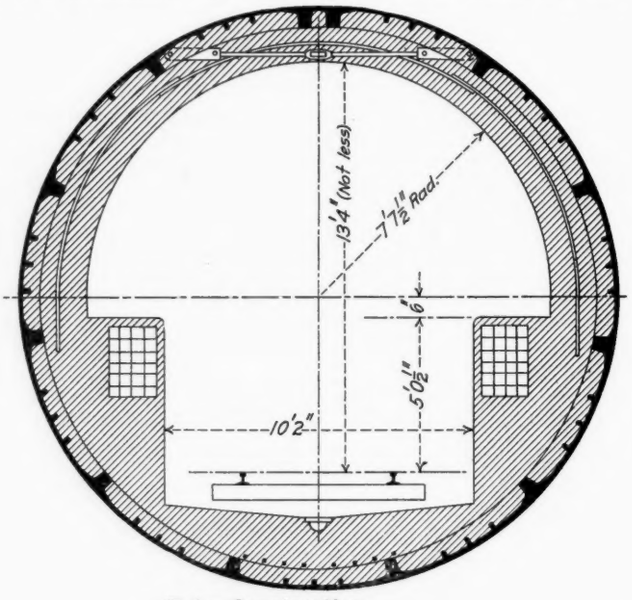
In all cases where the tunnels were started from shafts or chambers entirely in soft ground, shields were installed, even though the work necessitated blasting rock at later dates, but in the cases where work commenced in solid rock and passed from that into other material, the ordinary methods of soft ground mining were utilized.

In the river sections, where the tunnels were invariably constructed with shields, the iron tube lining has been used, but wherever the tunnels were constructed by mining methods the internal lining was completed in concrete.

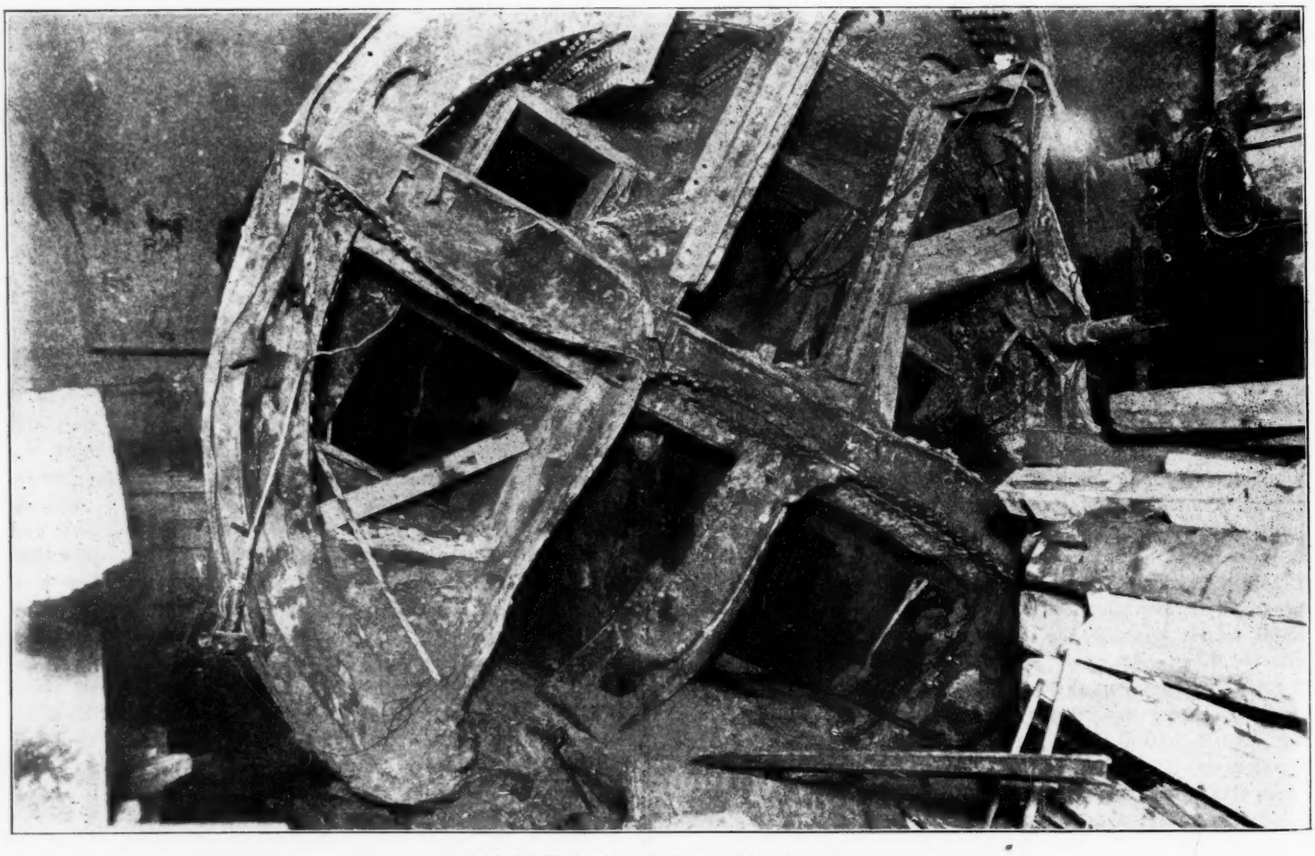
In all cases of construction in tube tunnel with a shield, excepting where the material is pure clay, it is essential to remove the material in advance of the shoving of the shield, as it is an absolute impossibility to shove the shield into any



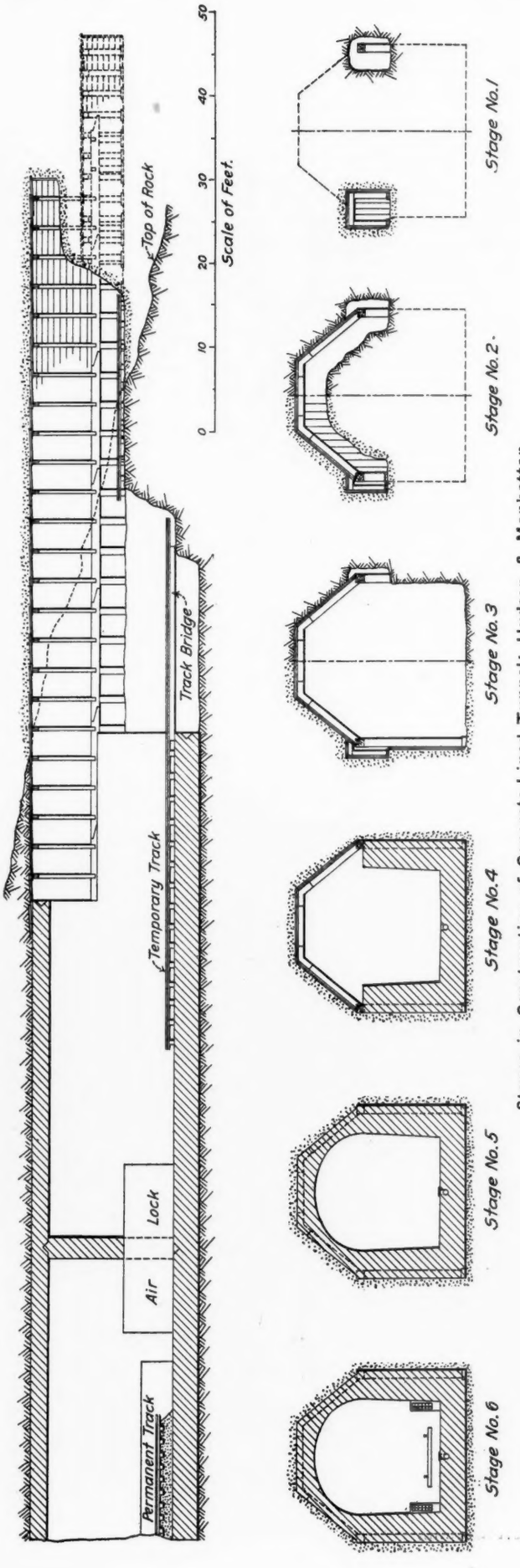
Tunnel with Cast Iron Roof Lining.



Tube Construction.



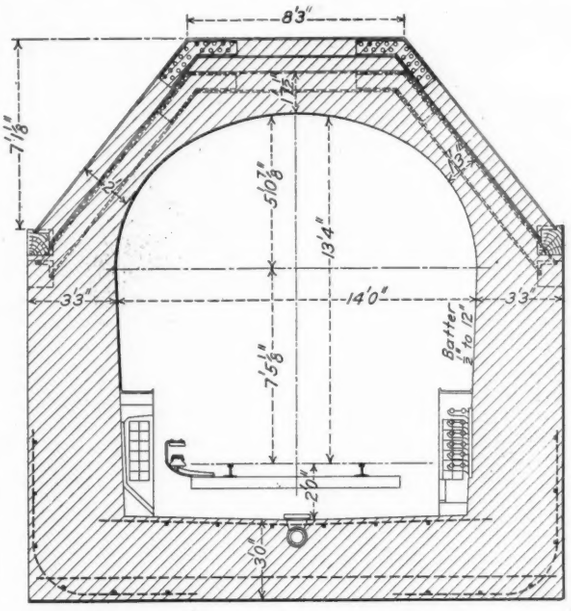
Shield Entering Caisson Number 3.



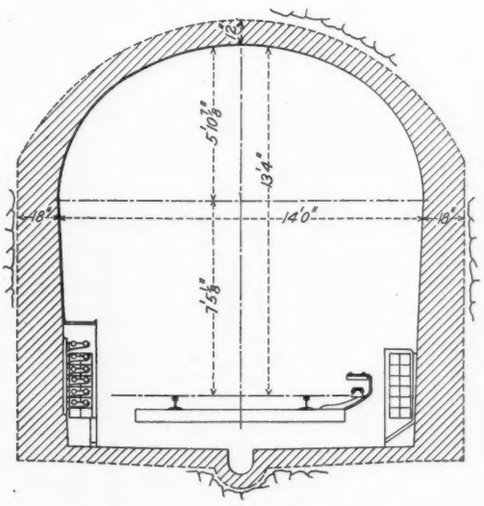
Stages in Construction of Concrete-Lined Tunnel; Hudson & Manhattan.

other ground than clay without most serious injury to the structure of the machine.

In carrying out the shield tunnel work with rock bottom and soft ground overlying, the greatest possible difficulties have been encountered throughout. In work of this character it is always necessary to support the top before the removal of rock, and consequently the soft ground overlying the rock for the length of a tunnel ring has to be cleaned out completely and the breast and roof supported by secure timbering before the rock can be attacked. In almost all these cases the material is very porous and allows the passage of enormous quantities of air; consequently, the exposed breast

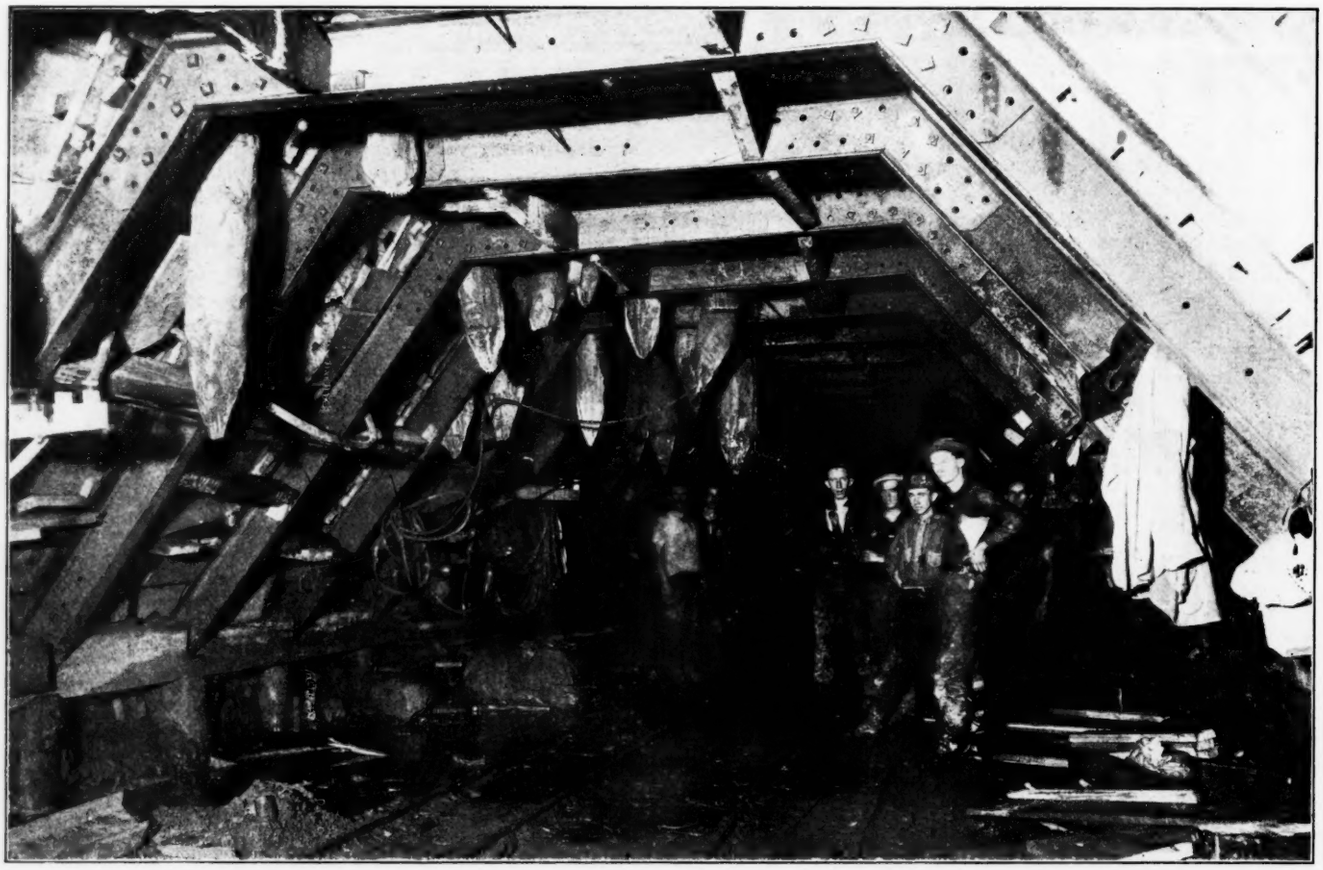


Section in Soft Ground.



Section in Rock Formation.

has to be carefully puddled with clay in putting the breast boards in place, and all cracks in the breast boarding also have to be plastered with clay in order to hold the air pressure. In addition to this, the tail of the shield has to be carefully packed to reduce the loss of air between the finished lining and the tail section of the shield. Having the soft ground breast carefully secured, the lower portion of rock has to be drilled and blasted as in ordinary rock operation, and as the charge of powder which can be used in the face of the shield, with the timbering overhead, is extremely limited, the work becomes tedious, difficult and dangerous. This



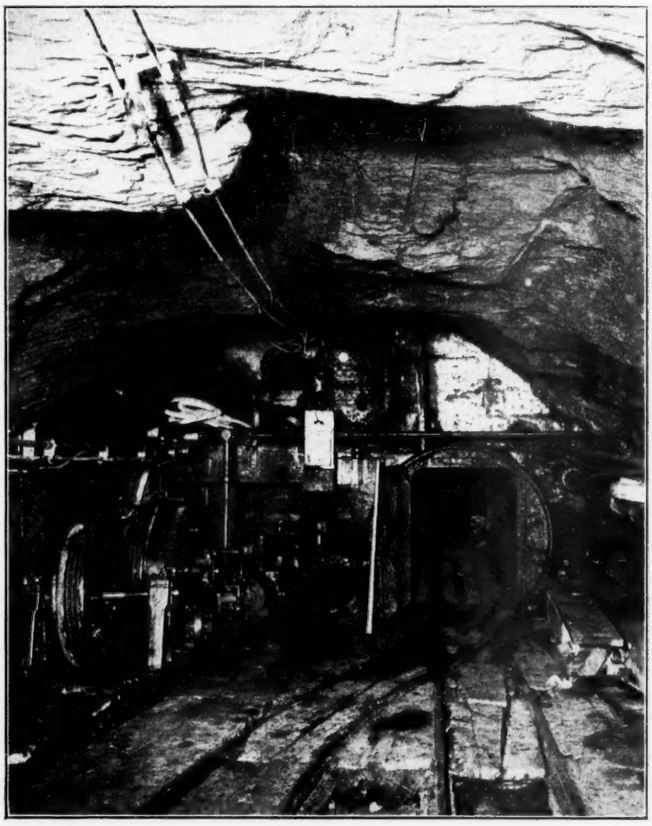
Old Piles Encountered in Soft Ground Work.

Tunnel Work in Soft Ground.

was particularly so in numerous cases where the rock ran along just at the roof line, so that there was practically a full face of rock with soft ground occurring immediately at the roof of the shield. This made the breasting and timbering of the overlying soil unusually difficult and hazardous.

It is interesting to note in this connection that in driving the shield for the westbound tunnel, forming the uptown approach from the Hudson river, under Christopher street to Twelfth street and Sixth avenue, the shield traveled and constructed 4,525 ft. of iron-lined tube tunnel, of which distance 2,075 ft. was in partial rock formation. In this work there were exploded in front of the shield itself 26,000 sticks of dynamite without disturbing the surface of the streets or buildings immediately above.

In the removal of rock partly in solid cross section but very largely in headings of this character, the company used 350 tons of dynamite. In the tunnels where underground mining methods were installed, the work was



Air Lock.

carried on with air pressure precisely as in the shield tunnels, but two side headings were driven at an elevation to permit of putting in wall plates in advance of any enlargement. The roof was supported by steel I-beam sets, consisting of light section 8-in. I-beams cut with the proper bevels for three section sets, connected by plate straps at the butts and spaced about 4 ft. apart. The lagging was executed in the ordinary manner with wood planking and any cavities carefully packed and the entire lagging plastered with mud. The fact that work was carried on in the river tunnels in the Hudson river silt at the same time work on these tunnels was being executed enabled the very finest quality of clay for plastering to be obtained economically, and a considerable amount of clay coming out of the river tunnel was, therefore, transferred to other points where soft ground mining was in progress, for the purpose of plastering. In lining these tunnels with concrete the concrete used was usually composed of one part cement, 2½ parts sand and five parts broken stone. The side walls were first constructed and the arch was usually built with a traveling arch frame, which was a light structure of steel plated with steel plates, running on wheels on a track.

(To be continued.)

LOCOMOTIVE COUNTERBALANCING.*

BY H. H. VAUGHAN,
Assistant to Vice-President, Canadian Pacific Railway.

The counterbalancing of locomotive engines is one of the few problems in connection with that apparently simple yet exceedingly complex machine which is capable of an exact theoretical determination.

When the weights, locations and movements of the various parts of an engine are known, it is possible to calculate accurately the forces which they cause at any speed of rotation, and apart from some practical considerations, such as the engine being constricted in its lateral movements by the wheels which support and guide it on the rails, and the fact

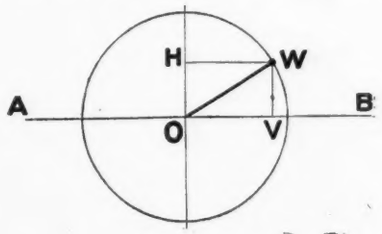


Fig. 1.

that it is connected in a more or less imperfect way with a tender, the movements which result from the action of these forces can also be exactly ascertained; this subject has consequently been very thoroughly treated by a number of writers, and I shall therefore endeavor to discuss, as shortly as possible, the theoretical principles which underlie it.

The disturbing forces which necessitate the counter-balancing of any reciprocating engine are those required to start and stop the mass of the reciprocating parts at each end of the stroke; neglecting the disturbance caused by the obliquity of the connecting rod, which is unnecessary to consider in any existing type of locomotive, these forces are identical with that caused by a corresponding mass at the crank pin, with the exception that they have no vertical effect.

In Fig. 1 let the weight W be rotating round the center O,

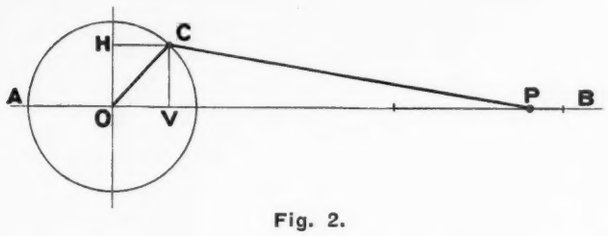


Fig. 2.

at a velocity of V feet per second; then what is known as the centrifugal force, which is really the force that is required to make W move in a curved line instead of in a straight line, as it would do if left to itself, acts along the line W O, and equals $\frac{W V^2}{32.2r}$ when r is the radius in feet.

This force W O can be resolved into two components W H and W V, the first acting entirely in a horizontal, and the other in a vertical direction; it will be seen that when W is on the vertical diameter W H is nothing, while W V equals W O, and when it is on the horizontal diameter W H equals W O while W V is nothing. Now, if the weight W moved

*A paper read before the Canadian Railway Club, and published in the *Proceedings* of the Club.

backwards and forwards along the horizontal line A B in such a way that its position on that line was always vertically under or over the position of W when rotating uniformly around the center O, the force necessary to accelerate or retard it is always W H, or, in other words, equals the horizontal component of the centrifugal force due to an equal weight rotating in a circle.

This is what happens in the case of a weight such as a piston and crosshead actuated in a horizontal line by a connecting rod, as in Fig. 2. Here the distance of the weight P from the center of the stroke corresponds with the horizontal distance of the crank pin C from the center O, and the force accelerating or retarding it is equal to C H when C O equals the centrifugal force which P would exert if moving on the path of C.

Since P in this case is moving entirely in a horizontal plane, it gives rise to no vertical forces whatever, and it is this face that introduces all the difficulties in connection with balancing an engine; before, however, discussing that question, the connecting rod must be referred to. It is evident that this has at one end a circular, and at the other a reciprocating movement, while between the ends, the motion of any part is of an intermediate nature; the result is the same as though part of its weight were concentrated at the crank pins and had a circular motion, while the remainder was concentrated at the crosshead and had a reciprocating motion.

To be continued.

TRAIN RESISTANCE.

BY F. J. COLE,
Consulting Engineer, American Locomotive Co.

V.

A circular letter was sent out to a large number of railway officers. The questions and abstracts of the answers are given as follows:

FREIGHT CAR RESISTANCE.

Question 1.—On level tangents, resistance per ton for freight cars of different capacities; the total weights including car and load of 15, 20, 30, 40, 50, 60 and 72 tons (2,000 lbs.) at different speeds, say from 5 to 35 miles per hour.

Pennsylvania Railroad.

We attach plots Nos. 1, 2, 3, 4 and 5-A, each under the title of "Total Resistance of Freight Cars on Various Grades at Slow Speeds," as follows:

Plot No. 1, dated 4-24-08—General Explanation of Fundamental Formula for Adjusted Tonnage Rating.

Plot No. 2, dated 4-24-08—Resistance in Pounds per Car and per Ton on Level Tangent at Slow Speeds, 5 to 30 miles per hour, according to weight of car, inclusive of lading for all cars from 10 to 80 tons each.

This, at present, is used in connection with tonnage rating where complete tonnage rating tests cannot be made, and therefore, where calculations have to be made in connection with the tests.

Plot No. 3, dated 4-23-08, and plot No. 4, dated 4-24-08, are derived from plot No. 2 by adding 20 lbs. per ton for each 1 per cent. of grade.

On plot No. 3 curves A, A', B and B' may be ignored.

Plot No. 5-A, dated 5-27-08—Line A on this plot is the same as plot No. 2; lines B and C have been added for illustration and comparison. While the straight line A is approximately true between the limits of weights per car, say 15 to 75 tons per car, data obtained tend to show in connection with the assumed fact that the resistance of a car of 0 weight is 0, that curve C covers the case more generally if we include cars of all weights. Curve B coincides with curve A at points (20-160-8) and (72-216-3) as will be seen, but differs in being a curve to pass through 0. Curve C differs from B in not passing exactly through point (20-160-80) in order to change the exponent in the formula from 0.234286 to the more convenient figure ¼. Moreover, tests show that 8 lbs. per ton for a 20-ton car is too high a resistance and our resistance curve will likely be modified as more data accumulates, showing the resistances to be somewhat lower than those given.

Tests indicate that at speeds of five miles per hour to 30 miles per hour the resistance on level tangent may be taken as constant, or at least that the resistance at 30 to 35 miles per hour does not exceed the resistance at 5 to 10 miles per hour.

Chicago, Burlington & Quincy.

Our resistance data is not subdivided for cars of different capacities nor for empty and loaded cars, nor for speeds varying from 5 to 35 miles per hour, but is shown on chart herewith for a speed of 20 miles.

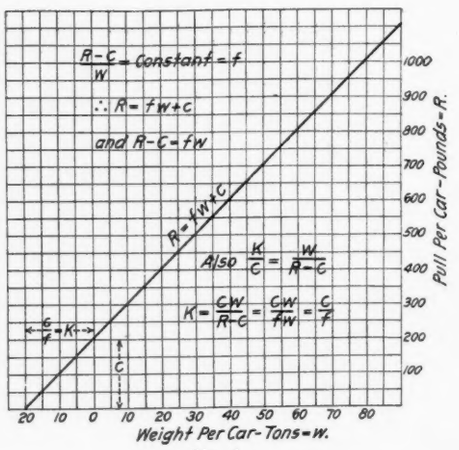


Fig. 1.

The fundamental formula for adjusted tonnage rating is:

Total resistance of one car on a level = $R = f_0 W + C$.

It follows, then, that the resistance on any grade will be the level resistance plus 20 times the grade in per cent. times the weight of the car in tons, or

$$Rg = W (f_0 + 20g) + C . = f w + C.$$

To find the car factor $= K = \frac{c}{f}$.

The total adjusted tonnage of any train = gross weight of train plus the car factor times the number of cars, or

$$Wt. = W + K N.$$

Consider two trains, one having a small number of heavy cars, and the other a large number of light cars. If the D.-B. P. of these two trains is equal, the total adjusted tonnage of both trains will be equal, so that

$$Wt = W + K N = Wt_1 = W_1 + K N_1$$
$$W + K N = W_1 + K N_1$$
$$W - W_1 = K (N_1 - N)$$
$$K = \frac{W - W_1}{N_1 - N} \quad (1)$$

If

N = Number of cars in first train;
N_1 = Number of cars in second train;
W = Weight per car in first train;
W_1 = Weight per car in second train.

From the general equation $R = f W + C$, we have

$$R N = (f W + C) N,$$
$$R N_1 = (f W_1 + C) N.$$

$R N$ and $R N_1$ being the D.-B. Ps. of the two trains, and assumed equal, as stated above.

Therefore,

$$f W N + C N = f W_1 N_1 + C N$$
$$f (W N - W_1 N_1) = C (N_1 - N)$$
$$\frac{c}{f} = \frac{W N - W_1 N_1}{N_1 - N}.$$

But

$W N = W$ = gross weight of first train;
$W_1 N_1 = W_1$ = gross weight of second train.

Therefore,

$$\frac{c}{f} = \frac{W - W_1}{N_1 - N}, \quad (2)$$

From (1) and (2)

$$\text{Car factor} = K = \frac{c}{f} = \frac{W - W_1}{N_1 - N} \quad (3) \qquad \frac{c}{f} = K.$$

Baltimore & Ohio.

One hundred thousand-pound capacity cars loaded at temperatures above 45 deg. Fahrenheit, level tangent, at various speeds.

Speed in miles per hour.	Resistance per ton.
5	3.95
10	3.98
15	4.29
20	4.59
25	4.86
30	5.18
35	6.46

Question 2.—If weights of cars are not subdivided as above give resistance for loaded and empty cars.

Pennsylvania Railroad.

The answer to this is included in the answer to Question 1.

Chicago, Burlington & Quincy.

See Fig. No. 2.

Baltimore & Ohio.

Average resistance of empty and loaded cars at about 20 miles per hour, at various temperatures.

	Capacity 60,000 lbs.		Capacity 80,000 and 100,000 lbs.	
	Empty.	Loaded.	Empty.	Loaded.
Above 45 deg.	10.0	6.5	9.0	5.0
Between 35 and 45 deg.	11.0	7.0	10.0	6.0
Between 20 and 35 deg.	13.0	8.5	12.0	7.0
Below 20 deg.	16.5	10.0	15.0	9.0

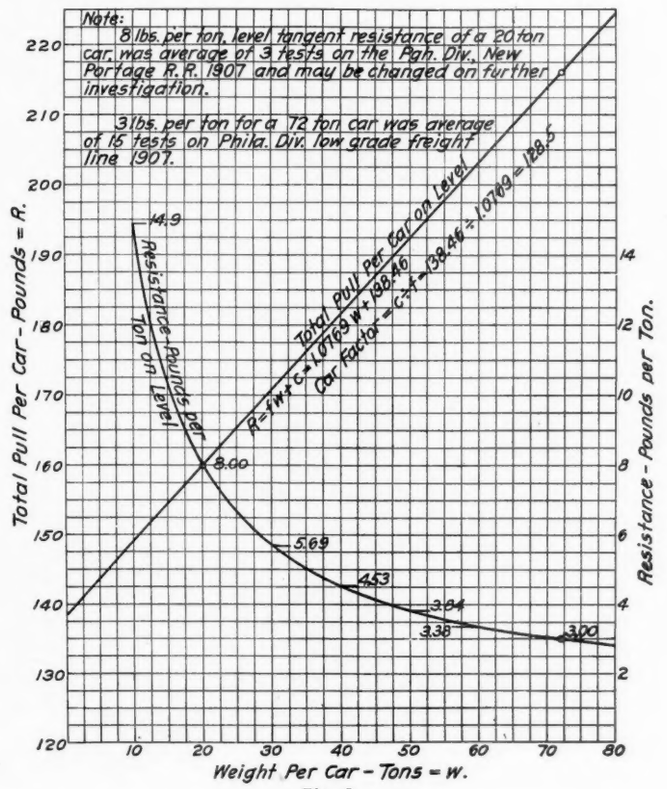

Note:
8 lbs. per ton, level tangent resistance of a 20 ton car, was average of 3 tests on the Pgh. Div., New Portage R.R. 1907 and may be changed on further investigation.
31 lbs. per ton for a 72 ton car was average of 15 tests on Phila. Div. low grade freight line 1907.
Total Pull Per Car on Level
R=fw+c=1.0769 w+138.46
Car Factor=C÷f=138.46÷1.0769=128.5
Resistance-Pounds per Ton on Level
Total Pull Per Car-Pounds = R.
Resistance-Pounds per Ton.
Weight Per Car-Tons = W.

Fig. 2.

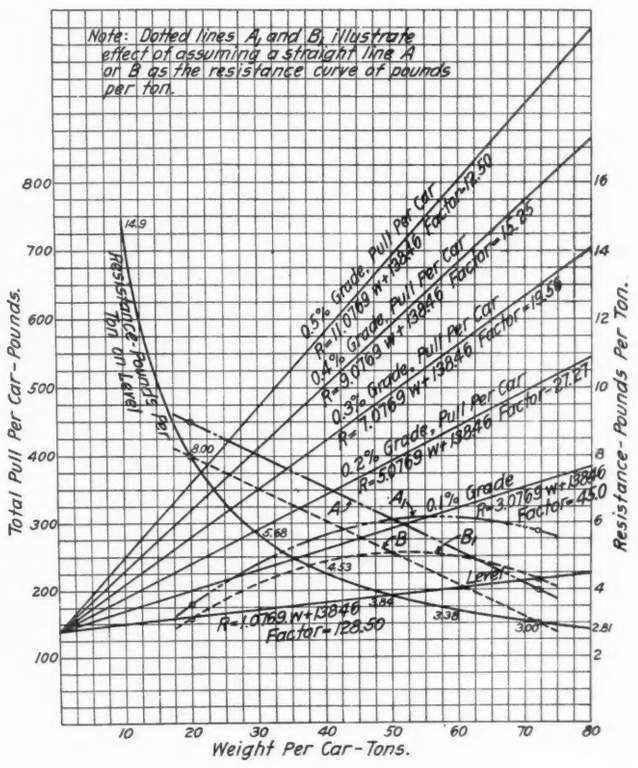

Note: Dotted lines A, and B, illustrate effect of assuming a straight line A or B as the resistance curve of pounds per ton.
Resistance-Pounds per Ton on Level
0.5% Grade, Pull Per Car R=1.0769 w+138.46 Factor=128.50
0.4% Grade, Pull Per Car R=1.0769 w+138.46 Factor=142.85
0.3% Grade, Pull Per Car R=1.0769 w+138.46 Factor=171.39
0.2% Grade, Pull Per Car R=1.0769 w+138.46 Factor=227.27
0.1% Grade R=3.0769 w+138.46 Factor=45.0
Level R=1.0769 w+138.46 Factor=128.50
Total Pull Per Car-Pounds.
Resistance-Pounds Per Ton.
Weight Per Car-Tons.

Fig. 3.

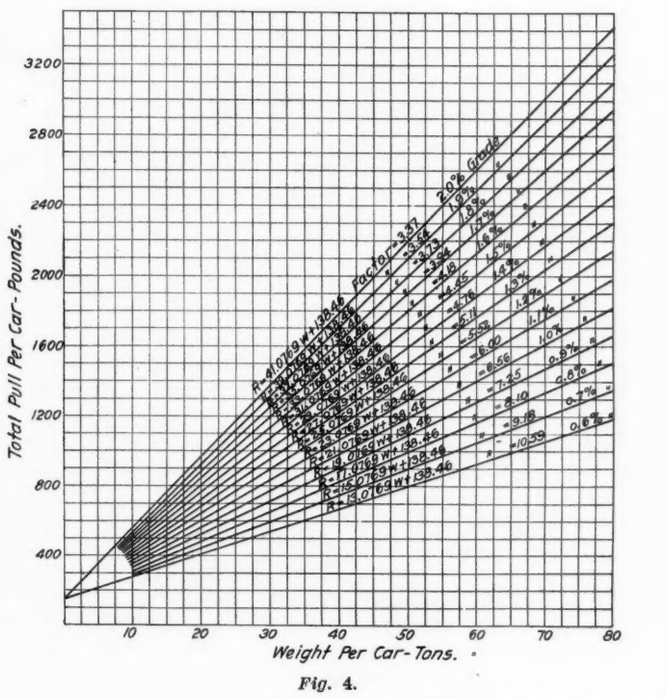


Fig. 4.

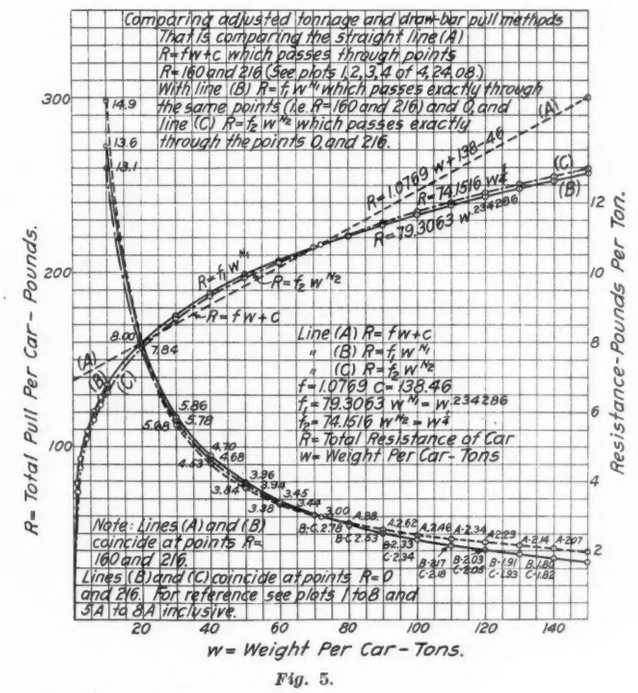

Comparing adjusted tonnage and draw-bar pull methods that is comparing the straight line (A) R=fw+c which passes through points R=160 and 216 (See plots 1,2,3,4 of 4.24.08.) With line (B) R=f1 w^N1 which passes exactly through the same points (i.e. R=160 and 216) and 0, and line (C) R=f2 w^N2 which passes exactly through the points 0 and 216.
R=1.0769 w+138.46
R=74.1516 w^.4
R=79.3063 w^.234286
Line (A) R=fw+c
(B) R=f1 w^N1
(C) R=f2 w^N2
f=1.0769 C=138.46
f1=79.3063 w^N1=w^.234286
f2=74.1516 w^N2=w^.4
R=Total Resistance of Car
w=Weight Per Car-Tons
Note: Lines (A) and (B) coincide at points R=160 and 216.
Lines (B) and (C) coincide at points R=0 and 216. For reference see plots 1 to 8 and 3A to 8A inclusive.
R=Total Pull Per Car-Pounds.
Resistance-Pounds Per Ton.
w=Weight Per Car-Tons.

Fig. 5.

Resistance of Freight Cars at Slow Speeds; Pennsylvania Railroad.

Southern Pacific Company.

Allowance to be deducted from total engine rating for light and unloaded cars on grades up to 1 per cent. is as follows:

For cars of less than 20 tons	3 tons.
" " " 20 to 25 tons	1½ "
" " " more than 25 tons	No allowance
On grades of over 1 per cent the following allowance is made:	
For cars of less than 20 tons	1½ tons.
For cars of over 20 tons	No allowance

Question 3.—Resistance for different weights of cars at starting. Some reliable authorities give as high as 17 lbs. per ton.

Pennsylvania Railroad.

Let w = the weight of car, including lading in tons, each car having four (4) axles;
a = acceleration desired in starting, feet per second, per second;
g = grade in per cent. on which the car is standing, plus (+) for an up-grade and minus (—) for a down-grade, at 20 lbs. per ton per 1 per cent. grade.
p = required pull, pounds.
$p = 441 + w(5.17 + 62.2a \pm 20g)$.

The above rule applies to a single car which has been standing for at least five (5) minutes and not a train of cars.

For a train of a considerable number of cars it would be safe to say that the pull required would on account of the slack allowing each car to start separately be as low, perhaps, as,

$$p = 181 + w(2.12 + 62.2a \pm 20g).$$

Chicago, Burlington & Quincy.

We have no data for this, but think 17 lbs. too high, as our engines with 35,000 lbs. tractive power start trains regularly weighing 3,000 tons on a .3 per cent. grade, which gives only 11⅞ lbs. resistance per ton.

Baltimore & Ohio.

This is very variable and we have no very reliable data.

(To be continued.)

FAULTS SEEN BY A TRAIN DESPATCHER.*

The address of Mr. Mackie at Columbus (*Railroad Age Gazette*, July 16, p. 106), with reference to the advisability of the chief despatcher handling the cars and power and leaving the enforcement of discipline and the riding of trains and the inspection of trainmen's work to the trainmaster as his duty, appeals to me from my experience under both systems. How obnoxious the interference of a trainmaster out on the road may be can only be appreciated by those who know how limited his knowledge of the entire situation may be. As to the statement that train despatchers feel their enthusiasm cooling, the most apt illustration of the reason therefor may be found in the words of Mr. Park, general superintendent of the Union Pacific, that "the science of railroading is the art of shifting responsibility."

Laying aside every consideration of the relative worth of men in an organization or the ethics of association in business, there is a large amount of valuable information relative to the handling of business and men that might be laid before the attention of the average superintendent with profit to the service. The making of a request for a special passenger train from the general passenger agent to the general superintendent, a handling of that from the general superintendent to the division superintendent, and from that office to the assistant, and from that office to the trainmaster, and from that office to the chief despatcher, is a loss of time and energy probably unequalled in any other line of business. A letter from the general passenger agent direct to the chief despatcher with copies sent to such intermediate higher officials as might require knowledge would be along the lines of least cost and prompt service.

The tendency of to-day is for the official in charge above a despatcher to feel grieved and revengeful if the shortcomings of the agencies with which a despatcher must deal are unearthed—or reported. In dealing with telegraph operators, the plea is that men cannot be had, and for that reason men who are unsafe, who are not free from booze when on duty, who do not know the methods of doing business, and who by reason of the limitations of their intellect never can know, are kept in service, hampering the train despatcher in his effort to secure the best results and adding greatly to the constant danger of wrecks by reason of working with defective tools. There are engineers who could not be driven over the road except on a caboose bounce who are prolific in excuses for failure to make a half way reasonable performance. There are conductors who are ready a long time before their work is done, who will stop to eat without saying a word, and who, when as well informed as the engineer that the engine is not steaming, that injector is out of commission or a grate down, will not furnish the information to the despatcher. For a despatcher to report facts of that sort, which have a direct bearing on his work, which are vital to the efficiency of the service, which are at the root of all effective discipline and which make it possible to weed out the mentally and physically unfit is to invite on him the grouch of the trainmaster, the road foreman of engines and, possibly, even the superintendent himself.

There are sufficient elements of uncertainty in the railway business without winking at operators who do not answer their calls; who are absent from their duties without permission; and who have their offices filled with outsiders to such an extent that good service is impossible.

Whatever may be the cause of this deplorable condition—whether it naturally follows association with men who water stock—who evade telling the truth to a person asking for service a little out of the ordinary as the easiest way out of the matter, or whether the unnatural location of tracks and facilities by men who little realized the purpose and functions of a railway—or whether the constantly increasing size of motive power and equipment without a corresponding increase of facilities to use them has created a feeling of contempt for railways generally, the fact remains that the train despatcher is often up against a tough proposition. There must be something more than his being made more close to the superintendent—the superintendent must come more closely in touch with higher officials; these men "higher up" must realize far better than they do now that the getting of money and the distribution of it so as to create a surplus does not solve the question of discipline, and that the harboring of inefficient men because of fear or laziness merely prolongs the cycle of demoralization in railway service.

*Extracts from a letter published in the *Train Despatchers' Bulletin.*

CASE HARDENING.

The committee on case hardening made its report before the International Railway Master Blacksmiths' Association in the form of a collection of the individual experiences of members of the committee. The following abstracts are taken from this matter.

H. PENTECOST.

I will outline our method of doing the work. We have quite an elaborate and up-to-date system of case hardening, having furnaces built especially for the work and men engaged for that purpose alone, and we consider our case hardening about as good as can be done, as we have spared neither time nor expense to get good results.

Our furnaces are built of special fire brick, each with two chambers or retorts made air tight, instead of boxes, as is generally used, with the fire space below between the two. These chambers are each 15 in. x 16 in. x 81 in. long; large enough to take in anything on an engine that needs case hardening from a guide down to the smallest pin.

These furnaces are full of flues that surround the chamber or retort where the case hardening is done, so as to keep it at an even heat all the time.

For fuel we use hard coke, as from our experience we get

a more satisfactory heat than when using either coal or oil.

For case hardening mixture we use charcoal, ground bone and potash, and mix them in the proportion of 200 lbs. charcoal with 50 lbs. each of ground bone and potash, renewing our mixture about every three or four days, according to the size and amount of work we are doing.

At the present time we are case hardening guides 3 in. x 8 in. x 66 in. long, and can put in, using both chambers, two complete sets, besides other small pieces. For these guides we keep them in the furnace 20 hours, as we consider that none too long to make a good job. For steel guides, where we case harden them we leave them in the furnace from 8 to 10 hours. For iron links, 10 to 12 hours, and steel links, 6 to 8 hours, according to the size.

We have a jib crane with cable air hoist to lift the work out of the furnace, with tanks in the floor large and deep enough to take in all the furnace will hold.

We keep these furnaces going all the time. We have men taking care of them both day and night, and the furnaces are always kept at a uniform heat.

BURNSIDE SHOPS, CHICAGO.

Take charcoal broken fine, say about one inch in size. Put a layer of this coal in the bottom of the box, say two inches, and pack it down with a mallet so as to make it solid. Then sprinkle about one pound of common salt over the charcoal; one pound of pulverized sal soda over the salt; one pound of pulverized rosin over the sal soda, and one pound of black oxide manganese over the rosin. Then lay the material to be case hardened on the compounds, taking care not to have the pieces too close together, nor too close to the sides of the box, where metal boxes are being used. After the work to be case hardened is placed in the box, fill in between with charcoal and pack well, taking care to have about two inches of charcoal between the work to be case hardened, and repeat the sprinkling of compounds over the second layer of work, the same as in the bottom of the box. Then finish off with about two inches of charcoal in the top of the box and sprinkle a little salt over the coal. Put the cover on the box, calk with clay, and place in furnace for 10 to 15 hours, according to the amount and size of the work to be case hardened. Heat to a bright red and cool in cold clear water.

The size of the box for the amount of compounds designated is about 12 in. deep, 15 in. wide, and 40 in. long. This box will hold one set of links, blocks, plates and pins.

J. G. JORDAN.

The practice at our shop is this: We use cast-iron boxes of different sizes to suit the different pieces to be case hardened. We have one box 12 x 24 in., one 12 x 36 in., and one 12 x 48 in.; the last-named is used only for quadrants, or in annealing cast tool steel.

At present we case-harden with bone black, which costs about six cents a pound. We first put bone black in the bottom of the box, then a layer of the articles to be case-hardened; then another layer of bone black, and so on until the box is full. We are careful that the different parts to be hardened do not come in contact with the box. When the box is full and well protected with the bone black, we put on a sheet-iron cover, and put clay on top of cover to make it as near air tight as possible. We then put the box in a furnace built for this purpose.

We use an oil furnace for this work, and I think it is the best as the heat can be better regulated. We keep the heat up to 1,450 to 1,500 degrees, and get very good results. We case-harden one-eighth of an inch deep in 18 hours, and one-sixteenth of an inch in 12 hours.

For a bath we use cold water, and keep it as cold as we can by letting the hot water run out and the cold water run in. By this process we make a good clean job that is very readily cleaned and made bright in the machine shop.

There is another way of case-hardening that we have practiced for several years. This is with common salt and potash, packed the same as with bone black. We use about 6 pounds of potash to a box 12 x 36 in., the balance salt. The salt and potash will melt and form a fluid that will boil. Cover is put on box loose so that the steam can escape while fluid is boiling. You can case-harden one-eighth of an inch in 8 hours by this process. A small box can be put in spring furnace when making springs. It will not interfere with making springs, and will save the extra expense of operating case-hardening furnace.

I remember when I first started case-hardening with salt. I was helping to take the different pieces out and put them in cooling vat. One of the helpers took a pair of wet tongs and put them in the box of salt and potash fluid, and in less time than it takes to tell it the box was empty and I was full of hot salt and potash. I was burned all over from the stuff. Care must be taken to keep everything wet away from the box.

Our people do not like the case-hardening with salt and potash on account of its being harder to clean than when the bone black is used. For a hurry job for the round-house when the engine is needed, we simply use cyanide of potassium or prussiate of potash. We heat the article to be case-hardened to a bright cherry red; put the potash on with a spoon, or rub the cyanide of potassium on with a pair of pick-ups; reheat the piece so treated, and then cool it in cold water. This will go in only about one-sixty-fourth of an inch, but we have to case-harden this way occasionally when the engine is needed.

W. J. SHEA, M'COMB, MISS.

Our method here is to use a cast-iron box, size depending on amount of work to harden. First we put in a layer of charcoal about 1½ in. thick; then sprinkle on a layer of ground bone; then we put in the pieces to be hardened; covering with bone and a small quantity of rock salt. Sal soda is sprinkled in with the bone, also a small percentage of cyanide of potassium.

After covering the first layer of work with bone, we put in more pieces and cover as before. A box the size of 10 in. x 12 in. x 36 in. we run 10 to 12 hours; use about 25 lbs. bone, 2 lbs. soda, 3 lbs. salt, ¼ lb. cyanide. Heat in oil furnace.

We have case-hardened large reamers made of soft steel. In packing I would use scraps of leather next to the reamer. The reamers have given good service. For quick work I use cyanide of potassium and saltpeter for potashing.

GEO. F. HINKINS, WILMERDING, PA.

We have introduced one new feature, and that is reheating the work after it has gone through the old method of case-hardening.

In reheating, we simply place the work in an open furnace, leaving it there sufficiently long to get a uniform and even heat. Heat up to 1,500 deg. Fahr. and cool in running water. This will add a higher percentage of hardness, and also restore all inequalities in the structure of the material.

If your first case-hardening has been overheated, causing the material to become brittle, careful reheating will restore or place the material in proper condition.

I have often noticed case-hardened material look crystalline all the way through on small articles, and be as brash or brittle as overheated and hardened tool steel. I have taken some of these same articles, properly reheated them, broke them and found the dark or gray iron fiber that was missing in the first hardening.

The success of good case-hardening is to harden to the desired depth, and retain in a great measure a tough and fibrous interior. This can be accomplished by reheating.

A bill has been sent to congress in Argentina approving the agreement with the Argentine Northeastern and the Paraguayan Central, according to which the government agrees to

spend about $2,000,000 building a line connecting the Entre Rios railways with the Paraguayan railways, using also ferry service.

THE POSITION OF ENGLISH RAILWAYS.*

BY W. M. ACWORTH.

Fifty years ago, not in England only, but throughout the civilized world, the English railway system used to be described as the greatest monument of private enterprise that the world had ever known. Within the lifetime of one generation private enterprise, with no help and not a little hindrance from the state, had, it was pointed out, constructed in Great Britain a network of railways which covered the whole face of the country, and was providing over that network a service of trains admirable both in speed and frequency. It was pointed out, too, how far the railways of the Continent, which, even where they were not directly state-owned, depended largely upon the government for their existence, lagged behind the private railway companies of England. Now that the fifty years have passed, it looks as though the next chapter to be written in the history of English railways will need to be headed "The Death of Private Enterprise."

All the signs at the present moment point in the same direction. Socialists, state socialists and semi-socialists of all sorts and conditions desire to see the state take over the railways. Sometimes the formula is "nationalization of the means of production"; sometimes it runs that "natural monopolies should be in public hands." But, whatever the formula and by whatever process, logical or illogical, arrived at, the result is that a very large number of people have an abstract preference for state, as distinct from private ownership. Other influences are of a more concrete nature. The railways employees would undoubtedly be found in very large majority on the same side. They think that the state employer would be sure to give them either more wages for the same work or less work for the same wages—or, possibly, even both benefits, less work and more wages combined. And they are probably not far wrong in so thinking. The post office employees are a much smaller and much less influential, because more scattered, body of voters, and they have undoubtedly been able to extract from the not wholly disinterested sympathy of Members of Parliament conditions of service markedly superior to those enjoyed by men doing work of a similar standard in private employ. There is yet another important class whose influence will make in the same direction: the railway shareholders and their officials. Given state purchase on fair terms—and state purchase of private property in this country has always hitherto been on terms that have been more than fair to the dispossessed owner—shareholders are bound to welcome it; while, as for the officials, it is only natural that they should offer no objection to a system which would either secure for them an ample pension or else, while preserving their existing salaries, give them a higher status and more influential position as government servants.

With all these forces making for state purchase it is difficult to see what forces there are to counterbalance them. A certain number of reflecting citizens would undoubtedly view the proposition with deep distrust. But they are not numerous and are unorganized and therefore uninfluential, and they would hardly be likely to take off their coats for a serious struggle. Undoubtedly the permanent officials of the Civil Service responsible for the finances of the country (whom we speak of collectively as "The Treasury") would oppose strongly any proposal that would at one stroke much more than double the national debt. But, powerful as the Treasury is, it could not in the long run stand out against public opinion and a majority of the House of Commons. So, as I have said, it is probable that the purchase of the English railways by the state will be a live issue in English politics within a very few years; and—as one of the most distinguished professors of political economy in the United States said in my hearing a few weeks ago—if that were to happen the echoes of the fall of private ownership would ring through the length and breadth of America.

I have spoken above of the change that half a century has brought. But a comparison between the quite recent history of the railways of the United States and England, respectively, is also not without interest. Fifteen years ago or thereabouts, when the common stock of many American railroads now far away above par was almost sold by weight, the common, or ordinary, stock of English railways was the favorite investment of very thrifty people of the middle class. The ordinary stock of one of our great lines paying perhaps a dividend of 6 per cent. stood at a price which only yielded the investor a bare 3½ per cent. for his money. As for new capital, the railway companies had only to hold out their hands and they could have it for the asking. There was no need to make a public issue. They peddled out their securities on the Stock Exchange, and the British public absorbed without hesitation as many millions of new stock as the railways thought fit to issue. And they issued that stock with a lavish hand. Stations and yards were enlarged all over the country, single lines were doubled and doubled lines were quadrupled over hundreds of miles. And naturally, for if nobody keeps a tight hand on the purse-strings, who can blame an operating official for desiring that the machine that he controls should have power amply to deal with all emergencies? To work traffic with inadequate rolling-stock on an overcrowded road may be extravagant, but it certainly implies hard and exhausting brainwork; and why exhaust one's brain when the board of directors are ready to order all the new rolling-stock asked for and to widen all the lines where congestion is so much as hinted at? And so, year after year, English railway capital went up by leaps and bounds, while no new territory was being developed and no new sources of traffic were being tapped.

The upshot is that English railways find themselves to-day in a position which has been described as "waterlogged" with capital. Dividends have fallen somewhat; the market valuation of the property has fallen far more, certainly not less than 30 per cent.; and companies which ten years ago were spending lavishly hardly dare to-day to attempt to raise money, and feel constrained to postpone even necessary improvements. Gross receipts have increased steadily, though not rapidly, according to American ideas; perhaps at an average rate of 2½ per cent. per annum. But expenses have risen much faster, and the net income has actually fallen off. Meanwhile, American experience has been strikingly different. Companies that ten years ago were in the hands of a receiver are paying dividends of 6 and 7 and even 10 per cent., and the market value of the railways of the United States has appreciated by a percentage at least as great as that by which the value of British railways has depreciated. Of course, this is not all due to the virtue or intelligence of American railway men. The abnormal growth of the United States has covered up not a few errors in policy, as well as a good deal of questionable or unquestionable finance. But the main difference, I think, has arisen from the stern lesson of adversity taught to American railways in the year of 1893, and from the way in which American railway officials took those lessons to heart. If an outsider might criticise, I should say that I am startled at the ingratitude which the American public has displayed in return for the marvellous skill and energy with which American railway men revolutionized the operation of American railways in the years when traffic began to recover after the panic of 1893. New

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capital being practically unobtainable, they made one dollar do the work of two, and turned out with the old plant an output that would have been inconceivable to the men ten years before.

Regarding the matter from an operating side, the American railways have had enormous difficulties to face, and on the whole have surmounted them. Their colleagues here have not been so successful. They have failed to keep down operating expenses. With a rapid increase in expenses, coupled with a rapid growth of capital, the result to shareholders could hardly be satisfactory. But the railway profession in America has enjoyed one great advantage denied to it in England. The tradition of American business life is publicity; secrecy is the tradition of British business life. The habitual mental attitude of the English railways is that no information should be given to the public, because the public would be sure to use that information for nefarious ends. And information, if it exists, is sure sooner or later to reach the public. For fear of this the British railway managements have denied themselves necessary information. They do not know to-day the average rate they charge for carrying a passenger or a ton of goods one mile. They do not know the average load of their trains or the average distance a ton of goods or a passenger is hauled. They possess no comprehensive system of units statistics by which a railway can be compared with itself year by year, or one railway can be compared with its neighbors. In the absence of scientific information scientific criticism and scientific discussions are alike impossible. One railway man cannot learn from the experience of another; the rising generation cannot be taught their profession scientifically, and are forced to rely on their own limited experience and rule-of-thumb methods.

It would not be fair to seem to imply that the present depressed condition of English railways is due merely to the shortcomings of English railway men of the present or of an earlier generation. Undoubtedly British railways have had great difficulties to face. With a revenue increasing but slowly, they have had to meet the demands, constantly more exacting, of the public and of the legislature. But I am bound to say that the conditions they have had to face have not been as difficult as those that have been faced successfully in America. The British legislature has interfered to require shorter hours of labor, large expenditure on safety appliances, and in some few cases even lower rates. But the sum total of it all has not been very serious. And I think an American railway official would breathe a sigh of content if he could exchange the whips of Louisiana or the scorpions of Texas for the gentle parental suasion of the British Parliament. Wages on British railways have gone up and hours of labor have gone down. The same thing has happened in the states. But in the states better organization has enabled one man to do the work of two, with the result that, per ton handled, wages are down, not up. That result has, unfortunately, not been attained in Great Britain. Again, British railways have suffered severely from the competition of tramways; but the competition in America has been fiercer and more ubiquitous than here. American railways met the competition at the outset with a considered policy. British railways, with some exceptions, have done nothing but sit still and weep over the loss year after year of suburban passengers by the tens of millions.

And so, as I began by saying, English railways are to-day in a critical situation—a situation from which the only ultimate escape, in my judgment, will be by way of state purchase. But nature does not, as the old proverb says, advance by leaps; certainly not English nature. English opinion has not arrived at state purchase yet; it is only in the preliminary stage. The present talk is all about pools; about arrangements for community of interest. The English attitude of mind in this matter is quite interesting. The average Englishman is, where his own personal interests are concerned, as strong an individualist as he ever was. He fully believes in competition where his own trade is touched, and he has not learned that the out-and-out competition of the open market is impossible in the special case of railways. On the other hand, he believes in combination in the abstract, and there is in England no such popular dread of pools as still exists in America. Pools have never been prohibited by English law. They have existed since the very beginning of English railways. One of the most famous and far-reaching pools was arranged more than sixty years ago by no less a person than Mr. Gladstone, and in not a few cases pools have been given direct Parliamentary authority. Some ten years ago the two railways which connect London with the Continent by way of Dover, the South Eastern and the London & Chatham, which had already pooled under statutory sanction a large part of their traffic, were united by an act of Parliament, described as a "Working-Union Act," into one company for all purposes of operation and traffic, though not of capital. And the following year Parliament also sanctioned important amalgamations of railways in Ireland.

Of late years, then, public opinion has tended to magnify the waste of competition rather than to insist on its advantages from the public point of view, and the influence of railway shareholders, who, as I have said, have seen their property rapidly decreasing in value, has naturally been thrown in the same direction. Moreover, at a private conference at the Board of Trade* in the autumn of 1907, which is likely to be famous in English railway history, the President of the Board is understood to have expressed his personal sympathy with the prevailing sentiment.

The English railway managers were naturally not reluctant to set their sails to the favoring breeze. Early in 1908 it was announced that two English trunk lines, the Great Northern and the Great Central, had entered into a perpetual working agreement of the closest kind. They claimed that, under powers conferred by an act of Parliament passed forty-nine years before, it was competent for them to do so, provided they obtained the consent of the Railway Commission. For that consent they accordingly applied. When, however, the case came before the commission the Board of Trade found itself constrained, whatever the private sympathies of the president may have been, to take up a position which, if not of actual hostility, was by no means an attitude of approval. A considerable number of other opponents, rival railway companies, municipalities affected, and others, appeared, the result being that the commission decided that they had no jurisdiction to sanction the proposed agreement and that the two companies must submit their proposals to Parliament in the usual way. And this the companies announced their intention of doing.

Before their bill could be introduced into Parliament at the beginning of the present session of 1908-09 events further developed. A third trunk-line company, the Great Eastern, threw in its lot with the Great Northern and Great Central, and the bill that was deposited provided for the working union of these three companies. In effect it would have sanctioned the monopoly in the hands of one undertaking of the whole eastern half of England from the Thames to the Humber. About the same time two of the remaining trunk lines, the North Western and the Midland—companies whose united capital amounts to over $1,500,000,000—also announced that they had entered into a close alliance; and subsequently the Lancashire & Yorkshire—a company which, though it only has 500 miles of line, serves a population greater than that of the whole state of New York—is understood to have joined the alliance. These three companies between them control the whole northwest of England almost as completely as the other three companies control the east. The alliance

*The Board of Trade is a department of the government and might well be called the Ministry of Commerce. Its president is a member of the government and a cabinet minister.

to the west differs, however, from the proposed union on the east in important particulars. Each member of the alliance preserves its separate identity and retains its own sole control of non-competitive traffic. But all competitive traffic is to be the subject of agreement, and the whole of the receipts therefrom are to be pooled and divided between the allies in agreed proportions. Further, the alliance is not, it may be assumed, beyond the ordinary legal powers of the companies concerned, and they do not propose to ask any parliamentary sanction to their bargain. Simultaneously movements in the direction of closer union have taken place among the railways both of Scotland and of Wales, but these latter need not be more than mentioned here.

The upshot of the position as sketched above is that throughout the greater part of Great Britain railway competition is dead. Theoretically, of course, competition survives between what I may call the east group and the west group to points where the two groups converge, say Manchester and Scotland. But the will to compete is gone, and if two parties refuse to compete it is quite certain that no outside authority can constrain them to do so. Further, unless the prevailing opinion among those interested in railway policy is more than usually wrong, those responsible for the management of the two groups have not yet by any means reached the goal at which they are aiming. The union of the three companies to the east and of the three companies to the west is, we are told, only a preliminary to the union of the whole six in a still more comprehensive agreement. The ultimate aim is alleged to be to unite all the railway companies of Great Britain into one single undertaking. And so it is thought that, on the one hand, the railway shareholders will have a more valuable property and one which will command a higher price when the state comes to buy; and, on the other hand, that the purchase by the state will be facilitated if there was only one venture instead of many to deal with. How far these suggestions and suppositions represent the real aims of the policy of the few men whose influence dominates the situation, it is not for an outsider to say. But no facts that have become public tend to disprove the correctness of the above prognosis.

Be this as it may, it is interesting to revert to the public history of the situation. The three eastern companies, as I have said, deposited in Parliament a bill to sanction their union, and it very shortly became evident that the same traders who were in the abstract, convinced of the wastefulness of competition and who were quite prepared to see competition abolished over their neighbors' traffic, were by no means so ready to sacrifice the advantages of competition when the traffic was their own. Parliament and the Board of Trade were besieged with objections from all and sundry. With great difficulty the influence of the board procured for the bill a second reading in the House of Commons; and when, after a debate which showed pretty distinctly that the government was not carrying with it the sympathy of its own supporters, the bill was read a second time and referred to a committee, so many petitions poured in and so many demands for far-reaching concessions were made upon the companies that they abandoned in despair the attempt to obtain Parliamentary sanction to their proposals and withdrew their bill. They are continuing, however, it is understood, so far as they can do so within the scope of their legal powers, to work in close union.

To complete the story the Board of Trade have within the last few weeks appointed a committee to advise them on the whole question of amalgamation. To the plain man it is not quite apparent why they have wanted advice. They did not invite it before they committed themselves to a policy which is practically amalgamation. But, on the other hand, if they did not want advice at the earlier stage, why do they want it now, when the question of Parliamentary sanction has for the present been decided?

Such, in outline, is the present position in England. Throughout the greater part of the country competition is dead and shows no signs of coming to life again. Yet the whole English railway system has grown up on the basis of competition. Foreign countries have relied for the control of their railways on state regulation. Englishmen have relied for control first and foremost on competition, with only a minimum supplement of state control in matters with which competition could not deal, such as excessive rates and provision for public safety. To work a system of executive control on the continental pattern the English have neither the experience nor the trained staff. And yet it is impossible to suppose that England will submit to an almost unregulated railway monopoly. The present position cannot be permanent. That England shall adopt a system of state regulation on the French pattern is to me inconceivable. For my own part, and I have been forced to the conclusion with the greatest reluctance—for I cannot but think that it is much against the public interest—I can see but one outlet from the position in which English railways find themselves, and that outlet is state purchase.

UNIFORM CLASSIFICATION.

BY SAMUEL O. DUNN,
Western Editorial Manager, *Railroad Age Gazette.*

IV.

UNIFORM MINIMUM CARLOAD WEIGHTS.

The commodities which a railway handles may be divided roughly into (1) articles which will load to a reasonable minimum weight in or on ordinary freight cars, and (2) light and bulky freight which can be loaded to but a small proportion of the *truck* capacity of ordinary cars or which requires special equipment.

(1.) The size of the shipments of most commodities which commercial and industrial concerns can make depends mainly on the consuming capacity of the territory in which they do business. What would be a reasonable minimum carload weight in the East might be so high as to be burdensome in the West or South. What a well-established manufactory in the East regards with equanimity may work a serious hardship on a new manufactory in the West. What to a grain shipper in the West would be a satisfactory minimum, especially when the supply of cars is short, may make so large a load that an interior eastern or southern receiver of grain could hardly handle it. At present minimums on the same commodity may differ widely in different territories. In the East minimums frequently are higher than in the West; and in the West they are higher than in the South. In order to make carload minimums uniform throughout the country it will be necessary either to lower the minimums for each commodity to the basis of the lowest minimums for that commodity in any territory, or to raise the minimums on each commodity to the basis of the highest minimums on that commodity in any territory, or to make some reductions in minimums and some advances in each territory; in other words, to effect a compromise. Whichever method is adopted many shippers will be satisfied; but where increases are made the shippers affected will find fault. There are bound to be cases in which, owing to advances in minimums, some shippers who are now barely able to make large enough consignments to get carload rates will be obliged to pay the higher less-than-carload rates. There will be other cases, no doubt, where the minimums will be so reduced that some shippers who cannot now get carload rates will be enabled to get them. Of course, the shippers who are injured will protest, but it is perfectly obvious that unless many advances are made to offset the reductions that will be necessary in the interest of uniformity railway revenues will be seriously affected and the

roads will be deprived of the benefits that they now derive from the reasonable loading of large capacity cars; and, of course, they will have no incentive for continuing to build large capacity cars unless they can utilize their large capacity.

(2.) In 1897 the American Railway Association, regarding the tendency to increase the dimensions of cars and depart from uniformity in construction as an evil one, adopted a resolution asking the traffic departments to co-operate with the operating departments in checking it. In 1901 this association made 36 ft. in length, 8 ft. 6 in. in width and 8 ft. in height, all inside measurements, the dimensions of the standard box car, and suggested that when necessary in any classification territory to recognize cars under 36 ft. in length, the recognition should consist in a reduction of carload minimums by 2½ per cent. for 35-ft. cars and 5 per cent. for cars 34 ft. long or less. For cars over 36 ft. long it suggested that minimums should be increased over the minimums for standard cars as follows: For cars of 37 and 38 ft., 10 per cent.; 39 and 40 ft., 25 per cent.; 41 and 42 ft., 40 per cent.; 43 and 44 ft., 55 per cent.; 45 and 46 ft., 65 per cent.; 47 and 48 ft., 70 per cent.; 49 and 50 ft., 80 per cent.; over 50 ft., 150 per cent. The association at the same time resolved "that no box cars of larger dimensions than these prescribed for the standard car shall hereafter be constructed." There evidently was a very definite intention to make unprofitable the use of cars more than 36 ft. long.

The Official (Rule 27) and Southern (Rule 35) classification committees adopted rules for minimum weights on light and bulky articles in accordance with this resolution, and the Southern still carries those rules in the classification. The rule in the Official classification has just been modified so as to provide that for cars over 36 ft. 6 in. long minimums shall be increased as follows: For cars 36 ft. 6 in. to 37 ft. 6 in., 3 per cent.; 37 ft. 6 in. to 38 ft. 6 in., 6 per cent.; 38 ft. 6 in. to 39 ft. 6 in., 9 per cent.; 39 ft. 6 in. to 40 ft. 6 in., 12 per cent.; 40 ft. 6 in. to 41 ft. 6 in., 17 per cent.; 41 ft. 6 in. to 42 ft. 6 in., 22 per cent.; 42 ft. 6 in. to 44 ft. 6 in., 32 per cent.; 44 ft. 6 in. to 46 ft. 6 in., 42 per cent.; 46 ft. 6 in. to 48 ft. 6 in., 52 per cent.; 48 ft. 6 in. to 50 ft. 6 in., 62 per cent.; 50 ft. 6 in., 100 per cent. On the other hand the Western classification committee never adopted the exact recommendations of the American Railway Association, but provided (Rule 45) for an increase in minimum weights of 3 per cent. for each increase in length of one foot over 36 ft. and a deduction of 3 per cent. for each decrease of one foot in length under 36 ft., with a maximum reduction of 9 per cent., these proportions being as one foot to the linear standard of 36 ft. In other words, the penalty for the use of a car larger than the standard has been about twice as heavy in the East and South as in the West. The method of grading minimums adopted by the western lines was not so well adapted to discourage the demand for and the consequent building of large cars as were the methods of grading adopted in the East and South, but the Western rule seems to have been fitted to certain conditions peculiar to the Western lines.

The chief characteristic of the interstate rate structure in Official classification territory is the New York-Chicago rate scale, with a percentage or differential adjustment for other points. Under this rate system almost the entire traffic between points east and west of Buffalo and Pittsburgh is handled, and on it the rates from points west of Buffalo and Pittsburgh to the Mississippi river are largely based. This is perhaps the best example of scientific and satisfactory rate making, on a large scale, in the country.

Perhaps the most characteristic feature of the rate structure in Western classification territory is the Mississippi-Missouri river rate adjustment; and the effect of this adjustment on minimum carload weights is especially significant. The lowest Iowa or Missouri state rate between the Mississippi river (St. Louis, Mo., to Dubuque, Iowa,) and the Missouri river (Council Bluffs, Iowa, to Kansas City, Mo.,) is taken as the rate for general use between the rivers. As some of the competing Missouri river lines reach the west bank of the Mississippi via the east bank and the east bank of the Missouri via the west bank, it follows naturally that these Iowa or Missouri state rates are generally applied on interstate traffic. As the distances between the rivers is materially shorter across the state of Missouri than across Iowa, the rates fixed by statute in Missouri are, in general, at the foundation of the western rate structure. The importance of this feature of the rate structure is increased by the practice of making rates to many points west of the Missouri river on the Missouri river combination, and is still further augmented by the fixed differential relation maintained between Chicago and the Mississippi river on traffic to or from the Missouri river or beyond.

The foregoing will help to show why a certain statute of the state of Missouri has had a very strong tendency to stimulate the building of large cars on western roads. This law fixes a carload minimum of 20,000 lbs. irrespective of the length of cars used on furniture, agricultural implements and wagons, which constitute the greater part of light and bulky freight and a scale of C. L. rates under which the rate from the Mississippi river to the Missouri river is only 22½ cents per 100 lbs., which is practically equivalent to fifth class, the normal rating for new furniture being second class and the minimum 10,000 or 12,000 lbs. The loading of agricultural implements is about 20,000 lbs. in a standard car, but furniture will scarcely load more than one-half as much. This low rate affords shippers a strong incentive to ship in carloads of 20,000 lbs. or more, and as it is not practicable to load 20,000 lbs. of furniture or light implements in a 36-ft. car, and as the law encouraged the Missouri shipper to demand from the railway cars larger than the standard or to supply two cars on the minimum for one large car, the large cars have been forced into use by competitive conditions throughout the vast territory where the Missouri river rate adjustment obtains. The railways, largely in consequence of this, had large cars built and, of course, it was not practicable to limit the use of these cars to Missouri, where the statute applied. It was necessary, in effect, for the western roads to use them for all light and bulky freight passing from Illinois, Wisconsin and the East to Missouri river points and the states beyond—Kansas, Nebraska, Colorado, Utah, Nevada, Arizona, New Mexico and Montana. In other words, notwithstanding the minimums provided in the Western classification, this Missouri statute, in effect, fixed, and still fixes, the carload minimum on a large part of the light and bulky articles moving over about 40 per cent. of the railway mileage of the country, although ostensibly it applies only in one state.

The consequence of the foregoing differences in rules, laws and conditions is that, while the increase in the number of large cars in the East and South has been relatively small, in the West it has been very great. An examination of the box car supply of the principal railways of the United States, having almost 700,000 box cars, shows that of the box car equipment of eastern roads approximately 36 per cent. is standard, while of the western roads only 19 per cent. is standard. Of the total supply of standard cars 60 per cent. is on the eastern roads and 40 per cent. on the western roads. The large box cars usually are 40 ft., 45 ft. or 50 ft. long. There has been practically no increase since 1901 in the number of 45-ft. cars. Of the large 40-ft. cars, having a capacity of 3,000 cu. ft. or more, 88 per cent. are on western roads, and these cars have increased in number more than 900 per cent. since 1901. Of the 50-ft. cars 84 per cent. are on western roads, and the number of these has more than doubled since 1901, when the rules framed to check the building of such cars were put in effect.

Under the conditions described the western shippers of light and bulky freight have an advantage over the eastern shippers, particularly to the great consuming territory in the West. If, for example, a Wisconsin shipper of furniture or vehicles asked for a large car—in which he can load to the 20,000-lb. minimum fixed in Missouri—the western road usually can supply a big car; and if the shipment moves to a point where the rules of the Western classification are operative the shipper will not be penalized for using a car larger than the standard. But if a shipper in Official territory—for example, in Michigan—asks for a car of similar size he cannot get it without being pretty heavily penalized under the Official rule relating to the grading of minimums. Furthermore, as the eastern roads have a smaller number of large cars than the western, and are less apt to have a big car available, they have generally made use of the largest western cars, in lieu of which they have generally refused to supply two smaller cars on the basis of the minimum of the larger one ordered.

The western roads have generally pursued the policy of protecting their carload minimums. If a shipper ordered a large car and was sent two small cars, the road let him use them on the basis of the carload minimum of the larger car. If a small car was ordered and a large one was sent the shipper was charged on the basis of the minimum for the smaller car. The eastern roads have been disposed to insist that on each car furnished should be applied the exact minimum provided in the classification for a car of its dimensions, even if the shipper had ordered a larger or a smaller car. These differences in rules, practices and sizes of cars have caused many contentions both between the carriers themselves and between the carriers and shippers over the application of carload minima on light and bulky freight. Under Rule 77 of the Interstate Commerce Commission's Tariff Circular 15-A each road is now expected to "incorporate in its tariff regulations a rule to the effect that when carrier cannot promptly furnish a car of capacity or dimensions ordered by the shipper and for its own convenience does provide a car of greater capacity or dimensions than that ordered, such car may be used on the basis of the minimum carload fixed in the tariffs for cars of the dimensions or capacity ordered by the shipper, and that if a car of a smaller capacity than that ordered by the shipper is furnished, it may be used on the basis of actual weight when loaded to its visible capacity, or that that portion of the shipment can be taken in another car and the shipment treated as a whole on the basis of the minimum fixed for the car ordered by the shipper, and that if a carrier is unable to furnish a car of large dimensions ordered by shipper it may furnish two smaller cars that may be used on the basis of the minimum fixed for the car ordered, it being understood that shipper may not order a car of dimensions or capacity not provided for in carriers' tariffs."

With scales of minimum weights determined by the length of cars only the tendency has been to increase their width and height. The road that increases the height and width of its cars of any given length is enabled to furnish shippers with cars of larger cubic capacity without a corresponding increase in the minimum weights. Now, of course, the shipper of most classes of light and bulky freight does not care anything about the stenciled capacity of the car, which is based on its truck capacity, nor even on its length alone; but he does care a great deal about its actual cubic capacity, and the stenciled capacity in pounds, the length and the cubic capacity do not vary together. The cubic capacity of 36-ft. cars varies from 1,900 to 3,100 ft.; of 40-ft. cars from 2,300 to 3,600 ft.; of 45-ft. cars from 2,800 to 3,800 ft., and of 50-ft. cars from 3,400 to 4,500 ft.

When such variations exist it is perfectly evident that it is absurd to base minimums on the lengths of cars without respect to what can actually be loaded in them. For light and bulky freight the loading capacity of a car is its cubic space. It is obvious, then, that under the present system of basing carload minimums on light and bulky freight on the length of cars alone, the same charge may be made for cars with capacities differing 50 per cent., and, in some cases, almost 60 per cent. When cubic capacity is the controlling factor in determining the value of a car to a shipper of light and bulky freight, why should not the minimum on such freight be determined by the cubic capacity rather than by the linear measurement of the car? This seems the only rational basis for fixing minimums on this class of freight; and until minimums are fixed on this basis the shipper who is furnished, say, a 40-ft. car with a capacity of 3,600 cu. ft. will be given a material advantage over the shipper who is furnished a 40-ft. car with a capacity of only 2,300 cu. ft. There is a loophole here for unfair discrimination which, while the matter of uniform classification is under consideration, should be closed. And apparently the only way to close it is, as already suggested, to base carload minimums on light and bulky freight in future on the cubic capacity of the car. This would be a move in the direction of uniformity that seems much needed.

How are the numerous differences between minimum weights and the rules governing them in the different territories to be eliminated? This is one of the hardest problems which the working committee has to solve. It would appear unquestionable that, having in view the interests of both the railways and the shippers, the tendency of minimum weights should be generally upward. A check of the box car equipment of 20 leading railways showed that out of a total of 455,226 cars 37 per cent. had a cubic capacity equal to or greater than that of a standard 36-ft. box car with a cubic capacity of 2,448 ft. and a stenciled capacity of 60,000 to 80,000 lbs., and that 88 per cent., with a length varying from 30 to 40 ft., had a capacity of 1,400 cu. ft. or more. A great majority of the articles the minimum weight of which is fixed at 30,000 lbs. can load 40,000 lbs. in a car with a cubic capacity of 1,400 ft. As heavy loading keeps down the average cost of transportation it is in the long run to the interest of shippers as well as railways that minima shall be made uniformly as high as commercial conditions will justify, and this, no doubt, the committee will try to do.

With regard to light and bulky freight, it is out of the power of the railways alone to regulate the minimums applied so long as any statute, such as that in Missouri, fixing a minimum that is manifestly beyond reasonable loading remains in effect. The roads cannot agree on a rule that will effectively penalize the use of big cars as long as that statute exists. The lines in the territory where 50-ft. cars are not generally in use cannot be expected to encourage their use by reducing their scale of minimums; and the lines in Missouri, where the law makes the minimum excessive, can scarcely be expected to agree to a scale of minimums that will practically be prohibitive of the use of their cars outside of that state. Assuming that with the establishment of uniform and reasonable classification regulations the repeal of the Missouri law in question can be secured, the solution of the problem of minimum weights on light and bulky freight apparently would be the fixing of a scale of minimums based on the real value of the car—that is, on its cubic capacity—and the recognition of the principle that the carriers should not be compelled to furnish the equivalent of cars not in general use in their territory.

It seems obvious that when the shipper of light and bulky freight pays for cars according to their real value he will be less interested in securing an unusually high and wide car of this or that company and will generally make use of the cars that are on hand, as shippers of other freight do; and from a transportation standpoint this is "a consummation devoutly to be wished."

General News Section.

The Chicago & Alton has announced an increase in pay for section men from $1.35 to $1.50 a day, effective September 1.

The line of the Oregon Short Line is now equipped with automatic block signals from Salt Lake City to Ogden, about 40 miles.

The last section of the Michigan Central tunnel under the Detroit river was sunk into place on September 14. It is expected that the twin tubes will be open for traffic on January 1, next.

The Cunard steamship "Mauretania," on her last eastward trip, arrived off Daunt's Rock in 4 days, 13 hours, 41 minutes from New York lightship, reducing the eastbound record 45 minutes.

A press despatch from Clinton, Ind., says that the United States Steel Corporation has acquired 29,000 acres of coal lands in that region. The purchases include the holdings of the Oak Hill, the Hammond and the Dering coal companies.

Judge Sater, in the United States circuit court of the Southern district of Ohio, has made permanent the injunction granted last month forbidding interference with non-union men working in the shops of the Baltimore & Ohio at Newark (Ohio), Zanesville and other places.

On the night of September 16, train No. 5, of the Denver & Rio Grande, was stopped by robbers near Malta, Colo., and the express car was blown open with dynamite. According to the despatches the robbers failed to open the safes and went off without securing any booty.

The Atchison, Topeka & Santa Fe completed the fiscal year ended June 30, 1908, without a fatal accident to a passenger. A similar remarkable record was made by the Chicago, Burlington & Quincy for the fiscal year 1909 and by the Pennsylvania System for the calendar year 1908.

The Atchison, Topeka & Santa Fe has completed the installation of its telephone line for train despatching between Chicago and Newton, Kan., 659 miles. There are now 18 divisions of the Santa Fe over which trains are despatched by telephone, including 380 stations, in a total distance of 1,925 miles.

The Illinois Central has placed "train auditors" on local trains between Memphis and Louisville and on some of the trains on the Evansville division. The experience of the company has been that on certain trains which do a very large local business the auditors are necessary if all the fares are to be collected; and auditors may be employed on other trains before long.

Ralph Modjeski, the consulting engineer called in by the board of estimate and apportionment to pass on the plans and safety of the new Manhattan bridge, New York, after the City Club had represented that the bridge was faulty in important particulars, has reported to Bridge Commissioner Stevenson and the board of estimate, giving the bridge practically a clean bill.

As a memorial to the late John Clark Sims, formerly secretary of the Pennsylvania Railroad, two free scholarships are to be founded this year at the University of Pennsylvania. In view of Mr. Sims' long connection with the road one scholarship will be open exclusively to Pennsylvania Railroad employees or to sons of living or deceased employees of the road east or west of Pittsburgh.

At Philadelphia, September 20, Abram C. Eby, mayor of Burkeville, Va., was convicted of using the mails to defraud. Mayor Eby had written to President McCrea, of the Pennsylvania Railroad, threatening to destroy the property of the Norfolk & Western (in which the Pennsylvania is interested) unless Mr. McCrea would give him $45,000 in cash and also appoint him as counsel for the Pennsylvania.

The Oregon Railroad & Navigation Company now distributes supplies for stations, sections, etc., by supply cars which are run over the line in local freight trains at stated periods. All requisitions are filled from these supply cars, which also gather up the worn out and broken tools. The branch storehouse at Pendleton, Ore., has been discontinued and supplies formerly sent out from there are now being issued from the general storehouse at Albina.

The Railroad Commission of Louisiana will hold a hearing at Baton Rouge, La., on September 28 on the adoption of a rule requiring all railways operating passenger coaches in Louisiana equipped with seats upholstered with plush or other heavy material, except leather or rattan, to provide clean linen covers for the same during the summer months. The question comes before the commission on petition of an officer of the Travelers' Protective Association.

The New York Public Service Commission, second district, reports for the month of July the number of passenger trains run on the steam railways of the state at 65,923, which is 8,698 more than the number run in July, 1908. The present report shows an average delay for each late train of 23.2 minutes; average delay computed on all trains, 2.6 minutes. The Erie and the New York, New Haven & Hartford report 93 per cent. of trains on time; New York Central, 92 per cent.

Shares of the Chicago Subway Company were quoted on Monday as low as 9, the price to which they fell during the slump last week. Officers of the company are quoted as ascribing the falling off in price to lack of confidence on the part of small holders since the death of E. H. Harriman. A. G. Wheeler, president, said that there is no foundation for reports of a reorganization; that the company's traffic is increasing daily and that orders have recently been given for 2,000 cars and 100 locomotives.

According to a press despatch from Detroit, Mich., a saloon keeper of that city has been sued by the Pere Marquette Railroad for $7,500 damages by reason of the derailment and wrecking of a freight train, which, it is charged, was the result of the misplacement of a switch on the night of July 12, 1907, by two boys, 18 and 16 years of age, to whom the Detroit saloon keeper had sold liquor. The wreck occurred at Webberville, and it appears that the boys rode to that place from Detroit on a freight train.

The brief, record and abstracts of the State of Illinois in the tax case against the Illinois Central Railroad have been filled in the Illinois supreme court by Attorney-General W. T. Stead. The case, which has been before the courts for several years, comes to the higher court on an appeal from the decision of Judge Stough of the circuit court of La Salle county, who sustained the demurrers of the railway company to the amended bill filed by the state asking for an accounting from the defendant. Oral arguments will be made in the case at the October term of court.

The Indiana State Tax Board is preparing to make a 40 days' inspection of the physical condition of the steam and interurban railways operating in the state. The law provides that such inspection shall be made every four years, and this is the time for such inspection. The tax board will compare the reports filed with the auditor of state by the railway companies with the reports filed with the railway commission and then make a personal inspection of the properties. A member of the tax board made to a reporter the statement—similar to one which we seem to recollect having heard in the last century, or earlier—that the roads are inclined to make a calamity report to the auditor of state and an optimistic report to the railway commission.

F. A. Delano, president of the Wabash, in an address before the Electric Club of Chicago, on September 15, outlined his plan for a union passenger terminal for all the railways entering Chicago excepting the Chicago & North Western and the Chicago, Milwaukee & St. Paul. His proposed location is on Twelfth street between Lake Michigan and the Chicago river, in a series of separate units of about 20 tracks each.

Under this plan no change would be made in the present Illinois Central terminal. Passenger tracks would be brought into the station on an elevated level and freight tracks on a depressed level. Mr. Delano explained that his interest in the plan was that of a citizen of Chicago rather than as a railway officer, and he commended the plan to the study of Chicago engineers.

Pennsylvania Track Prizes.

Prizes amounting to $5,400 have been awarded to Pennsylvania Railroad track supervisors and their assistants who have excelled in their work during the past year. The prizes, six in number, were distributed at Harrisburg at the close of the first day of the General Manager's Annual Inspection. The Main Line Track Inspection Committee for this year consisted of Joseph T. Richards, L. R. Zollinger, C. T. Dabney, W. L. Cooper and H. A. Jaggard.

The "Klondike" premium of $1,200, of which $800 goes to the supervisor and $400 to the assistant supervisor having the best line and surface between Jersey City and Pittsburgh and Philadelphia and Washington, was awarded to G. R. Sinnickson and M. W. Clement, both of Paoli, who have charge of the track from Woodbine avenue, West Philadelphia, to a point west of Coatesville, Pa.

The four premiums of $800 each—$600 for the supervisor and $200 for the assistant supervisor having the best line and surface on a main line superintendent's division between Jersey City and Pittsburgh and Philadelphia and Washington—were awarded as follows: W. F. Rench and S. L. Church, Tacony, Pa.; J. A. Burchenal and N. B. Pitcairn, Mifflin, Pa.; F. L. Pitcher and W. W. Hubley, New Florence, Pa.; Geo. Goldie, Jr., and E. K. Large, Lamokin, Pa. The improvement premium of $1,000, of which $700 goes to the supervisor and $300 to the assistant supervisor showing the greatest improvement in line and surface on the main line between Jersey City and Pittsburgh and Philadelphia and Washington, was awarded to D. T. Easby and W. S. Johns, Jr., Newport, Pa.

Live Stock in the Egg Car.

The story recently printed in the newspapers to the effect that eggs being carried from Kansas City to Chicago had hatched out chickens on the road seems not to be a reporter's yarn after all. The *New York Produce Review and American Creamery* says that such things happen now and then, during long spells of very hot weather, and backs up the statement with a photographic engraving of a case of eggs, received in New York last week from an Illinois shipper, in which several chickens had been hatched. The chickens hatched, however, were in the middle of the crate, and had been suffocated before the car was opened. We are glad to see that New York is not behind Chicago.

Another Courtesy Circular.

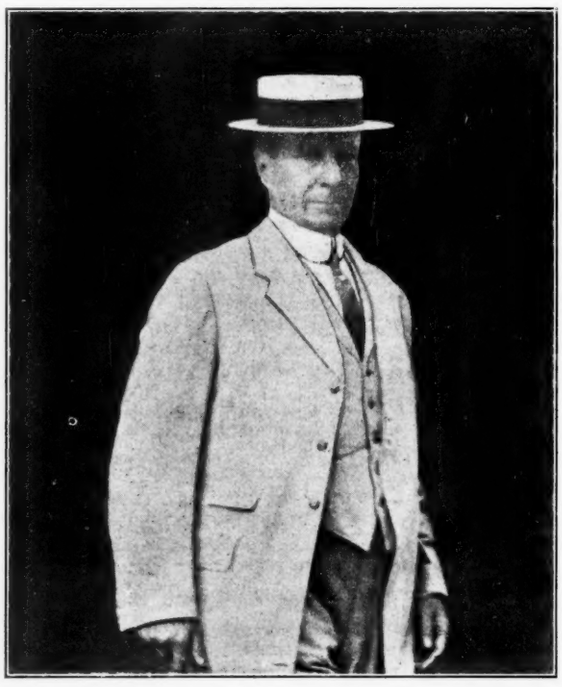
The receivers of the Norfolk & Southern Railway have issued a circular to employees saying that it is the desire of the management that its employees accord the public courteous treatment at all times. This can be done without cost or extra labor, and yield the company a valuable asset in securing the good will and friendship of the public. The traveling public will often solicit information from railway employees of a nature that seems simple and unnecessary to the train employee, but which is nevertheless complex and important to the party seeking it. The circular says that this information should always be given in a courteous and polite manner, and that where the information requested is beyond the knowledge or jurisdiction of the employee addressed, he should politely refer the patron to the proper source. "A railway company offers its freight and passenger transportation for sale on a similar basis and for the same purpose that the merchant offers his merchandise, and to successfully compete and increase its business should tender its customers the same welcome and courteous treatment that the merchant does. This same courteous treatment should extend from one department to another and from one employee to another, which will render the task of the departments and of each employee easier and pleasanter, with a larger return on output."

"The Hine System of Organization."

The St. Joseph & Grand Island, which is one of the independently operated Harriman lines, has adopted this system. General Manager J. Berlingett announces the appointment of F. T. Slayton as superintendent, and C. E. Hedrix, C. E. Slayton, Stewart Clark, M. A. Hartigan, Jr., and F. P. Rogers as assistant superintendents. The former titles of the assistant superintendents were master mechanic, traveling engineer, general roadmaster, tax and claim agent and chief despatcher.

Railway Injury and Damage Payments.

Slason Thompson, of Chicago, estimating from the reports of 21 railways, doing more than one-half the business of the country, says that the railways of the United States paid, approximately, $56,700,000 for loss and damage and for injuries to persons during the year ended June 30, 1908. In the preceding year these expenditures amounted to $47,258,587, and in the year 1898 to $12,182,003. He shows that where the payments on account of loss and damage increased $21,002,940, or 437.9 per cent., from 1897 to 1907, and on account of injuries to persons, $15,412,615, or 254.7 per cent., the increase relatively to gross earnings was 130.2 per cent. and 54.5 per cent., respectively. During the same period the percentage of gross earnings expended on these accounts increased from .539 per cent. to .829 per cent. The greatest increase in both items has been in the West and Southwest, and the "damage and injury industry" is said to have reached its highest development in Texas, where, in 1908, the railways paid 5.19 per cent. of their gross earnings on this account. Twenty-one roads in the fiscal year 1908 paid $31,242,882 in damages on these accounts, an increase of one-fifth over 1907. The railways of Great Britain and Ireland, in 1908, paid .68 per cent. of gross earnings on claims for loss and damage and injuries to persons, as compared with 1.825 per cent. paid in the United States in 1907.



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Judge Robert S. Lovett.

Chairman of the Executive Committee, Union and Southern Pacific.

President Taft's Proposals.

President W. H. Taft, in an address at Des Moines, Iowa, on September 20, outlined proposed changes in the interstate commerce act and the Sherman law which he will recommend to Congress in his annual message. The principal changes recommended by the President may be summarized as follows:

The establishment of an interstate commerce court of five members to decide appeals from decisions of the Interstate Commerce Commission with right of further appeal to the Supreme Court.

Extension of the power of the Interstate Commerce Commission, giving it authority to readjust, on complaint, classification of merchandise for transportation.

An amendment to empower the Interstate Commerce Commission to institute complaints against changes in rates on its own initiative (a power which it formerly held).

Legislation to prohibit one interstate railway company from owning stock in a competing company and compelling roads owning such stock to dispose of their holdings.

Legislation requiring the approval of the Interstate Commerce Commission as a precedent to the issuance of additional stocks, bonds or other obligations.

Legislation legalizing traffic agreements other than pooling contracts between railways subject to the approval of the Interstate Commerce Commission.

An amendment to the Sherman law limiting its prohibition to "combinations, conspiracies and contracts to restrain trade with intent to monopolize interstate trade or with intent to suppress competition therein."

The establishment of an accusatory bureau in the Department of Justice to institute prosecutions for violations of the interstate commerce and Sherman laws.

Heathen Timber.

When she leaves Linnton for China the steamer M. S. Dollar will have on board one of the most singular cargoes of lumber that have ever left the port. Her deck load is composed of huge unsawed logs which are destined to go into a Chinese temple. There are about 25 of these logs and they are over 100 ft. long. They average about 43 in. in diameter at the butt and each weighs in the neighborhood of 15 tons. —*Oregon Journal.*

The Central Western Association of Car Service Officers.

The fall meeting of this association will be held in Chicago Oct. 19.

Chicago Railway Club.

The Chicago Railway Club has formally opened its new headquarters at 112 Monroe street.

American Association of Traveling Passenger Agents.

At the annual meeting of the American Association of Traveling Passenger Agents, to be held in Chicago October 12 to 14, John Francis, general passenger agent of the Chicago, Burlington & Quincy, will deliver an address on "Complete Co-operation of Our Railroad Departments and Closer Relations with the Public." Besides the business sessions of the Association a number of entertainments have been arranged for the members during their stay in Chicago, including a reception in the new club rooms of the Chicago Traffic Club at the La Salle Hotel.

Western Railway Club.

The first fall meeting was held at the Auditorium Hotel, Chicago, on September 21. George S. Payson, general counsel of the Western Railroad Association, presented an address on the Relations of the Western Railroad Association to Railways and to Manufacturers of Railway Devices.

Traffic Club of Pittsburgh.

At the semi-annual meeting of the board of governors of this club, held last week, President W. O. Davis resigned, and Charles S. Belsterling, traffic manager of the American Bridge Co., was chosen president in his place. Mr. Davis is now division freight agent of the American Steel & Iron Co., at Chicago.

American Street and Interurban Railway Association.

Convention bulletin No. 4, recently issued, gives details of railway rates, Pullman rates and special trains to the Denver convention.

Society of Railway Financial Officers.

The annual meeting of the Society of Railway Financial Officers was held at Hotel Champlain, Bluff Point, New York, September 7 and 8, and was well attended. Fairfax Harrison, vice-president of the Southern Railway, spoke on Railway Securities, and Frank Scott, treasurer of the Grand Trunk, on the Canadian banking system. G. O. Waterman, treasurer of the Central of New Jersey, and Gilbert S. Wright, treasurer of the Evansville & Terre Haute, read papers on agents' remittances, and A. C. Torbert, treasurer of the Gulf, Colorado & Santa Fe, one on credits. The society lost one member by death during the year—Col. M. B. Bergeron, secretary and treasurer of Morgan's Louisiana & Texas.

Frank Scott.

The election of officers resulted as follows: President, Frank Scott (Grand Trunk); first vice-president, Frank D. Brown (U. P.); second vice-president, J. F. Titus (Ill. Cent.); secretary and treasurer, Carl Nyquist, Chicago. The new members of the executive committee are: Fairfax Harrison (Southern), J. E. Griffiths (Mich. Central), F. D. Brown (Union Pacific), S. L. Shannon (Intercolonial), G. O. Waterman (Central of New Jersey). The executive committee consists of these and the following: Geo. H. Crosby (Rock Island), J. F. Titus (Illinois Central), T. H. B. McKnight (Pennsylvania Lines West), Frank Scott (Grand Trunk).

General Passenger and Ticket Agents.

At the fifty-fourth annual convention of the American Association of General Passenger and Ticket Agents, held at Toledo last week, the following officers were elected for the ensuing year; President, Samuel G. Hatch, general passenger agent Illinois Central, Chicago; vice-president, Samuel Moody, general passenger agent Pennsylvania Lines West, Pittsburgh; secretary, C. W. Burt, general passenger agent Boston & Maine, Boston. The next annual meeting will be held in Havana, Cuba, on a date to be determined by the executive committee.

George A. Cullen, general passenger agent of the Delaware, Lackawanna & Western, delivered an address on the "Value of Personality in Railroad Service." He advocated courtesy and kindliness on the part of the men selected for coming in contact with the public, especially ticket agents and conductors. George T. Bell, passenger traffic manager of the Grand Trunk, in his address as retiring president of the Association, referred to the work of the joint committee representing this Associa-

tion and the Association of American Railway Accounting Officers toward reducing the number of interline ticket forms as one of the most important that could be undertaken by the Association. He also favored the appointment of a committee to consider and report upon a plan for securing the most efficient and experienced men as ticket sellers. He said that if left to the initiative of individual lines or territorial passenger associations, reforms in these two directions would be slow and uncertain compared with results likely to follow the well-matured recommendations of strong joint committees representing all transportation lines and all interested branches of the passenger service.

Reports were received from the committees on Association ticket paper, uniform ticket contracts, uniform accounting methods and standard colors in the printing of interline tickets.

Alex Hilton, general passenger agent of the St. Louis & San Francisco, was chosen to deliver the principal address next year.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.
AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa. June, 1910; Niagara Falls, Ont.
AMERICAN ASSOC. OF LOCAL FREIGHT AGENTS' ASS'NS.—G. W. Dennison, Penna. Co., Toledo, Ohio.
AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.—R. W. Pope, 33 West 39th St., New York; second Friday in month; New York.
AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York, Nov. 17; Chicago.
AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—S. F. Patterson, B. & M., Concord, N. H.; Oct. 19, 1909; Jacksonville, Fla.
AMERICAN RAILWAY ENGINEERING AND MAINT. OF WAY ASSOC.—E. H. Fritch, Monadnock Bldg., Chicago. March 14-17, 1910; Chicago.
AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis; second Tuesday, May; Memphis, Tenn.
AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago.
AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. Edgar Marburg, Univ. of Pa., Philadelphia.
AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., N. Y.; 1st and 3d Wed., except July and August; New York.
AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., N. Y.; 2d Tues. in month; annual, Dec. 7-10; New York.
AMERICAN STREET AND INTERURBAN RAILWAY ASSOCIATION.—B. V. Swenson, 29 W. 39th St., New York; Oct. 4-8; Denver, Colo.
ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago. June 29, 1910; Colorado Springs.
ASSOCIATION OF RAILWAY CLAIM AGENTS.—E. H. Hemus, A., T. & S. F., Topeka, Kan.; May; Nashville, Tenn.
ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Wisconsin Central Ry., Chicago. May 16-20, 1910; Los Angeles.
ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 24 Park Place, N. Y. Dec. 14-15; Chattanooga.
CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.: 1st Tues. in month, except June, July and Aug.; Montreal.
CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, Montreal, Que.; irregular, usually weekly; Montreal.
CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.
FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich., Fred. & Pot. R. R., Richmond, Va. June 15, 1910, California.
INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.
INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago.
INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.; May; Cincinnati.
IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month; except July and August; Des Moines.
MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago.
NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tues. in month, ex. June, July, Aug. and Sept.; Boston.
NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.
NORTH-WEST RAILWAY CLUB.—T. W. Flanagan, Soo Line, Minn.; 1st Tues. after 2d Mon., ex. June, July, August; St. Paul and Minn.
RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, Pittsburgh, Pa.; 4th Friday in month; except June, July and August; Pittsburgh.
RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.; Oct. 12-14; Louisville, Ky.
RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.
ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.
ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Norquist, Chicago.
SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—J. H. O'Donnell, Bogalusa, La. Oct. 21; Birmingham, Ala.
SOUTHERN AND SOUTHWESTERN RY. CLUB.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs., Jan., April, Aug. and Nov.; Atlanta.
TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R. R. R., East Buffalo, N. Y.
WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, 199 Chestnut St., Winnipeg; 2d Mon., ex. June, July and Aug.; Winnipeg.
WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony Bldg., Chicago; 3d Tuesday each month, except June, July and August; Chicago.
WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, Monadnock Bldg., Chicago; 1st Wednesday, except July and August; Chicago.

Traffic News.

The Chicago & North Western has announced that beginning September 18 additional tourist sleeping car service will be installed between Minneapolis and St. Paul and Los Angeles, leaving Minneapolis at 7:30 p. m. on Saturdays.

The Louisiana State Railroad Commission on September 28 will hold a hearing on the adoption of an order establishing the same mileage rates for transportation between points in Louisiana on corn and oats, regardless of nativity, as apply on corn and oats native grown, in accordance with the commission's order of July 29, 1909.

The chambers of commerce of Boston and Philadelphia, the Merchants' Exchange of New York and other bodies will oppose the adjustment of commodity rates proposed by the northwestern roads and intervening petitions will be filed with the Interstate Commerce Commission. Representatives will be sent to the hearing to be held in Spokane next Wednesday.

The Grand Trunk has announced that on September 30 it will discontinue the practice of granting stopover privileges on limited tickets at 16 cities in Michigan. On account of the demands of rival communities stopover privileges have been extended liberally during the past summer to scores of small cities both east and west. It is understood that action will be taken shortly by the other western railways to reduce the number.

The Oklahoma Corporation Commission will conduct a hearing on October 12 on the proposed schedule of local and joint mileage rates for freight, passenger and express service within the state. It is proposed to discontinue fractional mileage by disregarding all fractions of a mile less than five-tenths and by raising al fractions of five-tenths and over to an even mile. A hearing will also be held on a proposed order requiring express companies doing business in the state to file their tariffs with the Commission.

Frank Hagerman, counsel for the Missouri railways, has filed in the federal court at Kansas City a cross appeal to the United States supreme court from the decision of Judge McPherson, in which the Missouri 2-cent fare law was held confiscatory. The state recently appealed from Judge McPherson's decision, and the railways in their petition ask the court to decide that a rate cannot be enforced against a strong road that is not enforced against a weak road. The railways also object to the court's finding that they must pay one-half the cost of the suits.

The Chicago, Milwaukee & St. Paul has refused to withdraw its tariff providing for the free delivery of western grain to lake boats through its elevator at Milwaukee, which was requested by competing roads on account of complaints on the part of Chicago grain shippers who declared that they were being discriminated against. As a result, practically all of the western roads entering Chicago have filed tariffs providing for an allowance to elevators at ½ a cent a bushel on bulk grain delivered to lake lines at Chicago. This has caused numerous complaints by grain shippers operating all-rail elevators.

The Chicago & North Western in the fiscal year ended June 30 carried 27,000,000 passengers without a fatal accident to a passenger. The North Western runs 900 passenger trains a day. This number of passengers is more than all the railways in the United States carried in 1850. The Atchison, Topeka & Santa Fe also completed the last fiscal year without killing a passenger. Similar announcements have also been made by the Chicago, Burlington & Quincy for the fiscal year 1909 and by the Pennsylvania System for the calendar year 1908. Other roads no doubt could give equally good records.

The Chicago, Milwaukee & St. Paul, in competition for the Puget Sound mail contract, has submitted a proposition to the post-office department to put on a new train after the first of the year from Chicago to Seattle and Tacoma, under a schedule considerably shorter than that proposed by the Burlington and the Great Northern. The proposed schedule provides for a train to leave Chicago at 9:55 p. m. on Sunday, to leave Minneapolis at 8:15 a. m. Monday, to arrive at Seat-

tle at 6 a. m. Wednesday and at Tacoma at 6:50 a. m. Wednesday, and to run every day in the week on this schedule. The apparent time would be 55 hours and 55 minutes, or elapsed time, 57 hours and 55 minutes. The proposed schedule of the Great Northern is 56 hours and 10 minutes, or 58 hours and 10 minutes, allowing for the difference in time. The Great Northern route is some 70 miles longer than that of the St. Paul.

Bill of Lading Conference, American Bankers' Association.

A conference of the bill of lading committee of the American Bankers' Association, with representatives of various shippers' organizations and the railways, was held in Chicago on September 13. The railways were represented by Henry Russel, general counsel of the Michigan Central; J. S. Ford, chairman of the treasury committee of the Association of Railway Accounting Officers, and George H. Crosby, secretary and treasurer of the Chicago, Rock Island & Pacific. Mr. Crosby presented a paper prepared by J. F. Titus, assistant to the president of the Illinois Central, who was unable to be present.

Lewis E. Pierson, vice-president of the Bankers' Association, presented the report of the bill of lading committee, which urged legislation both by congress and the states, as well as more careful practice on the part of bankers, railways and shippers to safeguard the use of "order" bills of lading, in order to prevent losses. The bankers have complained that they are frequently subject to heavy losses through the use of bills of lading and that railways in some cases have nullified some of the provisions of the uniform bill of lading by stamping new additions on its face. The railways take the position that many of the losses of the bankers are due to carelessness on their own part in accepting incorrect bills or bills not properly endorsed. This was explained by Mr. Titus in his paper on "Incorrect Practices in the Use of the Bill of Lading."

The following resolutions were passed as representing the views of the bankers in their demand for uniform bill of lading laws and for the purpose of urging more care in handling bills of lading:

"Resolved, That it is the sense of this conference that the Uniform Bills of Lading Act, approved and recommended for enactment by the Commissioners on Uniform State Laws, at their annual conference at Detroit, Mich., August 23, 1909, should be enacted in every state and territory of the Union, and that the representatives here present will recommend to their respective associations or organizations the taking of such measures as will aid toward the passage of this law in the various states and territories." [Presented by George W. Neville, chairman bill of lading committee, New York Cotton Exchange.]

"Resolved, That it is the sense of this conference that Congress be asked to pass a law governing bills of lading covering interstate shipments to embody the features contained in the 'Bill Relating to Bills of Lading,' which was pending before the House Committee on Interstate and Foreign Commerce and made the subject of four hearings before a sub-committee last winter; and that we recommend to our respective associations or organizations the taking of such steps as will aid in the enactment of such measure by Congress." [Presented by J. C. Lincoln, president National Industrial Traffic League.]

"Resolved, That the conference recognizes the duty of the bank first accepting a railway's bill of lading for a shipment to order, with a draft attached, to see that the bill of lading is (1) properly drawn on the uniform 'order' blank; (2) that it is an original and not a duplicate; (3) that it is properly endorsed, and (4) that the bill of lading is promptly forwarded to its destination." [Presented by J. S. Ford, chairman treasury committee, Asociation of Railway Accounting Officers.]

"Resolved, That the banks at the point of shipment be requested to insist upon the observance of the following requirements, as a prerequisite to their handling and financing of bills of lading:

"First. That all bills of lading for all shipments to order be drawn upon yellow uniform 'order' bill of lading blank, upon which the words 'Order Bill of Lading' are printed, and not upon the white form provided for 'Straight' bills of lading.

"Second. That the order bill of lading is an original and not a duplicate.

"Third. That the order bill of lading is properly endorsed.

"Fourth. That all bills of lading, 'order' or 'straight,' with draft accompanying, be forwarded to destination promptly, and by the most direct route.

"Fifth. That both 'order' and 'straight' bills of lading bear the official stamp of the issuing agent in addition to his signature; that the bills be filled out in ink or indelible pencil; and that the quantity be stated in writing as well as in numerals." [Presented by Thomas B. Paton, general counsel, American Bankers' Association.]

Following is the substance of the address delivered before the Bankers' Association by J. F. Titus, of the Illinois Central:

The practice of shipping freight "to order," that is, making delivery conditional upon surrender of the bill of lading, has grown enormously. A very considerable proportion of shipments handled by the railways are covered by "order" bills of lading. Unfortunately, many shippers neglect to indorse such bills of lading. They attach them to drafts on the party to be notified and deposit the drafts for collection. The bank at destination, upon payment of the amount of the draft, delivers the bill of lading which is then presented to the railway company without bearing positive evidence that it has come properly into the possession of the party presenting same. Further embarrassment is caused by the banks accepting from the shippers drafts with *duplicate* bills of lading attached, although the documents themselves recite specifically that the *original* will be required as a precedent to delivery of the shipment. The party at destination pays the draft, presents the duplicate bill of lading to the railway company and expects to get the freight.

Frequently "order" shipments arrive at destination before the bill of lading, because the shipper has not promptly deposited it with his bank, or the bank has sent the draft through an indirect channel. The railway is often called upon to make delivery of such shipments and take chances of securing the bill of lading later.

In instances similar to the three mentioned, the railway is presented with the alternative of assuming the heavy responsibility (not contemplated in the original contract with the shipper) of delivering the shipment without the proper document duly executed, or, by standing upon its legal rights, to refuse to make delivery until the original bill of lading, duly indorsed, has been surrendered. The latter course will entail delay and often cause loss and damage and great annoyance to one who is often a valuable patron and equally with the railway not responsible for the failure to have the original bill of lading properly indorsed ready to surrender, as was contemplated in the contract.

It is not necessary to remind you of the obligation of the railway companies under these bills of lading. The relation of the company, called upon to make delivery of such a shipment to the bill of lading, is very similar to that of a bank to a draft drawn upon it; that is, there should be the direct authority, by indorsement, on the bill of lading, of the party to whose order the shipment is made.

* * * Shippers are frequently careless about getting the proper document and use the "straight" bill of lading for "order" shipments, leaving it to the bank and railway company at destination to straighten the matter out for them. This matter could be controlled by the banks at the initial points. By their aid a heavy and unwarranted responsibility and burden could be lifted from the railways and the banks at points of delivery, and a source of constant irritation between them and their patrons removed.

STATE COMMISSIONS.

The Texas Railroad Commission has issued an order dismissing a petition of Houston rice shippers that the Commission establish a minimum rate of 2 cents and a maximum rate of 5 cents for the transportation of rice from producing to milling points within the state.

The Railroad Commission of Washington has issued an order reducing the intrastate grain rates on the Northern Pacific, excepting on its Washington Central branch, to 87½ per cent. of the rates in effect June 30 last. The rates of the Great Northern and the Northern Pacific Washington Central branch, which are involved in the same case, are reserved for a further order. The order is accompanied by an exhaustive opinion which takes up in detail the expenses and earnings of the railway on state and interstate business, in which it is declared that the Northern Pacific has earned excessive profits on state business; that is to say, profits above an annual return of 7 per cent. on its investment.

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF JULY, 1909.
(See also issue of September 17, 1909.)

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses						Net operating revenues (or deficit).	Outside operations. net.	Taxes.	Operating income (or loss).	Increase (or dec.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total, inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	General.	Total.					
Alabama & Vicksburg	143	$71,590	$38,694	$118,663	$23,818	$15,557	$3,564	$38,877	$5,049	$86,865	$31,798	.....	$4,000	$27,798	$10,622
Alabama Great Southern	309	162,720	91,821	279,874	27,706	74,983	8,290	86,789	10,762	208,530	71,344	—$315	11,236	59,793	—8,792
Ann Arbor	301	81,530	50,035	141,365	23,218	11,531	4,576	52,121	4,786	96,232	45,133	4,420	12,330	37,223	16,282
Atlanta & Birmingham Air Line	237	49,225	23,885	77,812	13,042	6,634	876	29,150	1,868	51,570	26,242	.....	4,833	21,409	5,235
Atlantic City	167	66,778	190,535	266,181	19,154	17,625	2,442	107,535	368	147,124	119,057	—2,762	7,000	109,295	29,827
Bessemer & Lake Erie	201	847,662	35,218	889,649	67,545	111,118	7,218	182,910	7,141	375,932	513,717	.....	5,000	508,717	175,544
Buffalo & Susquehanna	361	169,414	26,034	202,005	37,931	46,610	1,974	69,555	7,660	163,730	38,275	83	4,000	34,358	2,320
Butte, Anaconda & Pacific	46	83,275	10,972	99,973	11,295	18,931	388	37,485	1,721	69,820	30,153	.....	2,000	28,153	—20,910
Carolina, Clinchfield & Ohio	211*	38,914	11,324	52,228	10,305	10,951	2,912	11,518	4,928	40,614	11,614	.....	2,500	9,114	10,628
Central New England	294	184,722	31,620	227,652	56,894	21,286	1,454	75,254	2,671	157,559	70,093	.....	6,500	63,593	33,540
Central Vermont	411	193,335	111,851	326,983	41,613	37,640	9,292	127,406	6,839	222,790	104,193	1,318	10,116	95,395	47,744
Charleston & Western Carolina	339	62,931	26,346	96,553	25,745	12,585	2,120	35,689	3,399	79,538	17,015	.....	4,475	12,540	—11,443
Chicago & Erie	269	248,452	71,616	355,810	49,766	88,704	14,621	150,142	8,526	311,759	44,051	.....	11,478	32,573	25,085
Chicago, Cincinnati & Louisville	284	79,696	34,320	119,057	23,462	19,068	8,589	49,887	5,739	106,745	12,312	.....	3,405	8,907	25,936
Chicago, Indiana & Southern	341	237,030	24,441	268,229	56,019	48,684	9,595	88,108	7,234	209,640	58,589	274	12,500	46,363	51,571
Chicago, Peoria & St. Louis	255	87,211	28,831	122,173	14,603	24,833	6,143	45,578	5,402	96,559	25,614	.....	4,150	21,464	16,225
Chicago, Rock Island & El Paso	111	48,319	21,064	74,579	6,340	12,436	623	22,060	1,876	43,335	31,244	207	2,504	28,947	7,529
Chicago, Rock Island & Gulf	524	173,542	64,110	249,439	33,793	14,768	6,283	96,339	8,044	159,226	90,212	—250	6,261	83,701	77,429
Cincinnati & Muskingum Valley	148	48,354	19,289	72,440	15,507	8,839	1,431	24,149	1,156	51,082	21,358	.....	3,400	17,958	2,835
Cincinnati, Hamilton & Dayton	1,036	513,681	165,643	755,049	125,738	137,356	20,396	286,457	20,792	590,739	164,310	.....	25,833	138,477	37,715
Cincinnati, New Orleans & Texas Pac.	337	502,045	124,760	662,013	57,710	132,680	18,203	196,977	17,415	422,985	239,028	780	20,000	219,808	33,064
Cincinnati Northern	248	59,562	23,509	88,331	16,831	18,816	2,726	27,466	2,299	68,138	20,193	.....	4,100	16,093	—1,682
Cleveland, Akron & Columbus	210	122,075	41,955	177,375	31,610	42,042	3,029	54,851	3,870	135,402	41,973	.....	5,000	36,973	2,231
Cleveland Terminal & Valley	93	70,148	16,745	92,341	14,990	10,993	1,725	35,555	1,779	65,042	27,299	.....	3,403	23,896	5,359
Colorado Midland	337	122,295	44,463	200,071	29,095	34,227	10,047	76,502	5,350	155,221	44,850	477	9,350	35,977	—15,090
Cumberland Valley	162	155,000	52,594	217,382	34,577	19,943	3,889	61,424	7,877	127,710	89,672	667	4,084	86,255	—2,966
Detroit & Mackinac	348	67,407	29,387	102,525	17,096	16,663	2,358	30,234	2,383	68,734	33,791	1,565	7,209	28,147	—6,167
Detroit, Toledo & Ironton	438	91,180	14,546	113,789	23,225	10,586	3,571	55,282	3,938	96,602	17,187	—20	6,510	10,657	13,746
Duluth & Iron Range	168	1,324,495	20,060	1,354,306	96,151	58,012	298	169,044	8,533	332,039	1,022,267	5,243	53,757	973,753	286,762
Duluth, Missabe & Northern	282	1,963,637	37,324	2,009,782	104,043	106,136	1,543	212,135	10,452	434,309	1,575,473	6,398	83,701	1,498,170	403,290
Duluth, South Shore & Atlantic	594	175,101	95,947	285,234	56,671	26,462	9,752	99,427	10,976	203,288	81,946	1,088	16,000	67,034	17,360
Evansville & Terre Haute	310†	121,267	51,723	191,253	25,001	19,961	5,181	57,556	6,336	114,035	77,218	—1,261	8,872	67,085	1,688
Georgia Southern & Florida	395	93,301	57,729	169,501	17,468	31,074	5,172	67,740	8,062	129,516	39,985	1,647	8,066	33,566	8,415
Gulf & Ship Island	307	108,312	38,826	155,930	33,331	26,151	1,040	49,198	7,047	116,767	39,163	.....	4,852	34,311	23,426
Hocking Valley	350	431,848	79,550	531,265	68,783	97,899	7,951	143,014	12,234	329,881	201,384	22,864	20,312	203,936	403
Houston, East & West Texas	191	61,752	29,617	97,002	14,924	8,456	1,390	30,760	3,266	58,796	38,206	.....	4,808	33,398	3,107
Indianapolis Southern	179	45,514	20,617	70,387	19,235	11,962	1,780	28,093	1,213	62,283	8,104	.....	3,733	4,370	—10,083
International & Great Northern	1,159	359,788	170,444	572,030	137,495	131,876	18,648	240,325	20,030	548,374	23,656	.....	20,000	3,656	—22,087
Kanawha & Michigan	175	181,132	28,575	213,994	40,295	38,328	1,193	50,157	4,019	133,992	80,002	—55	6,842	73,105	14,912
Lehigh & Hudson River	96	99,710	4,137	104,956	18,741	15,797	1,309	37,467	2,893	76,207	28,749	.....	2,750	25,999	12,654
Lehigh & New England	170	68,459	1,253	70,231	13,944	7,310	1,129	18,385	2,864	43,632	26,599	.....	850	25,749	866
Louisiana & Arkansas	226	87,781	14,648	106,091	19,705	16,418	1,459	24,214	4,283	66,079	40,012	.....	1,810	38,202	12,626
Louisiana Ry. & Nav. Co.	350	67,967	15,629	94,297	16,743	11,436	5,198	41,277	5,502	80,156	14,141	.....	3,600	10,541	27,342
Louisiana Western	198	94,503	49,358	151,686	16,345	25,528	5,044	39,511	7,065	93,493	58,193	—312	5,000	52,881	3,468
Louisville, Henderson & St. Louis	200	45,982	32,636	83,905	22,312	7,804	3,618	27,813	3,019	64,566	19,339	275	2,500	17,114	190
Mason City & Fort Dodge	386	115,087	43,863	169,793	21,998	16,288	1,614	63,819	406	104,125	65,668	497	7,662	58,503	12,902
Midland Valley	324	71,709	26,388	103,020	16,827	21,887	1,727	28,290	4,827	73,558	29,462	.....	8,000	21,462	21,462
Mobile & Ohio	1,114	561,668	110,196	783,566	88,849	117,596	27,853	275,877	31,525	541,700	241,866	—2,430	19,250	220,186	31,604
Mobile, Jackson & Kansas City	403	75,702	27,619	111,813	18,566	11,176	2,298	37,171	9,005	78,216	33,597	.....	3,344	30,253	8,276
Morgan's La. & Tex. R.R. & S.S. Co.	358	204,673	91,401	314,430	42,940	56,974	9,112	122,918	12,506	244,450	69,980	1,515	16,000	55,495	2,257
Nashville, Chattanooga & St. Louis	1,230	625,498	230,428	910,984	145,123	179,347	38,276	306,565	20,259	689,570	221,414	.....	20,500	200,914	13,881
New Orleans & North Eastern	196	171,403	48,343	236,215	26,166	36,219	9,072	86,181	9,365	167,003	69,212	.....	7,600	61,612	7,868
New Orleans Great Northern	275‡	70,010	30,391	105,341	24,634	13,819	1,940	27,554	4,921	72,868	32,473	—74	700	31,699	27,412
New York, Susquehanna & Western	151	118,699	62,125	202,445	27,474	19,447	1,888	71,786	3,293	123,888	78,557	—1,782	11,317	65,458	4,557
Northwestern Pacific	375	111,609	217,595	349,535	46,427	32,831	2,428	99,454	9,780	190,920	158,615	.....	10,581	148,034	22,941
Peoria & Eastern	351	164,607	56,127	239,794	33,103	35,475	5,910	85,123	4,804	164,415	75,379	.....	8,800	66,579	10,393
Pittsburgh & Lake Erie	191	1,279,447	137,925	1,449,478	131,808	127,269	16,903	263,158	20,105	559,243	890,235	—167	17,000	873,068	353,034
Pittsburgh, Shawmut & Northern	240	71,578	11,197	84,187	13,210	20,904	1,188	27,494	3,174	65,970	18,217	.....	1,569	16,648	24,129
St. Joseph & Grand Island	319	96,117	35,742	141,753	31,891	13,176	6,402	43,688	3,706	98,863	42,890	—11	5,143	37,736	1,810
St. Louis, Brownsville & Mexico	456	58,009	37,229	103,425	26,866	8,222	2,420	41,675	5,969	85,152	18,273	.....	3,600	14,673	670
Santa Fe, Prescott & Phoenix	257	76,797	32,800	117,533	17,867	8,428	2,917	27,220	5,127	61,559	55,974	.....	.....	55,974	11,789
Southern Indiana	236§	85,957	15,562	104,327	14,114	12,391	1,667	27,836	5,204	61,212	43,115	.....	6,928	36,187	33,668
Spokane International	141	43,591	25,923	71,571	8,628	4,684	1,997	20,915	2,824	39,048	32,523	.....	1,957	30,566	15,773
Syracuse, Binghamton & New York	81	40,743	35,228	87,228	7,269	5,321	3,307	24,580	2,471	42,948	44,280	.....	4,250	40,030	6,756
Tennessee Central	292	84,020	32,483	123,011	16,893	12,102	3,573	37,588	9,428	79,584	43,427	.....	4,200	39,227	5,942
Texas Central	268	31,147	38,656	76,280	23,241	16,510	1,612	27,391	4,360	73,114	3,166	.....	3,070	96	13,670
Toledo & Ohio Central	441	262,005	54,747	328,372	53,062	57,937	4,510	104,509	5,276	225,294	103,078	6,477	13,184	96,371	—87,785
Toledo, Peoria & Western	248	43,918	35,083	83,608	17,373	13,842	2,297	30,535	3,350	67,397	16,211	.....	4,000	12,211	—4,892
Trinity & Brazos Valley	455	82,116	16,787	102,212	30,485	29,435	4,901	56,268	10,066	131,155	—28,943	.....	3,000	—31,943	828
Ulster & Delaware	129	64,672	77,855	148,069	15,989	9,223	2,361	45,280	2,450	75,303	72,766	6	3,200	69,572	16,634
Vicksburg, Shreveport & Pacific	171	56,951	39,032	103,714	15,535	20,594	3,035	32,555	4,126	75,845	27,869	.....	6,200	21,669	—2,164
Virginia & Southwestern	188	87,515	11,533	102,115	17,223	17,445	1,360	27,313	3,500	66,841	35,274	.....	3,900	31,374	279
Virginian Ry.	444‖	102,873	18,426	128,328	24,091	31,593	4,370	37,270	6,539	103,864	24,464	553	8,000	17,018	18,089
Wisconsin, Minnesota & Pacific	271	31,883	20,315	56,714	9,694	4,534	123	22,694	153	37,198	19,516	—8	4,083	15,425	4,403

*Mileage operated end of July, 1908—75. †Includes Evansville & Indianapolis R.R. Co. ‡Mileage operated end of July, 1908—113. §Mileage operated end of July, 1908—351.
‖ Mileage operated end of July, 1908—204. —Indicates Deficits, Losses and Decreases.

Railroad Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

The general offices of the Licking River Railroad are at 1449 Railway Exchange, Chicago, and not at Cincinnati, Ohio.

C. G. Smith, auditor of the Macon, Dublin & Savannah, has resigned, to become examiner of accounts for the Interstate Commerce Commission, Washington, D. C., effective October 1.

C. C. Barry, secretary and auditor of the Houston & Texas Central and auditor of the Houston East & West Texas and the Houston & Shreveport, has resigned to engage in other business.

Operating Officers.

See item regarding the Hine System of Organization on the St. Joseph & Grand Island under General News.

J. D. Ahern has been appointed superintendent of car service of the American Refrigerator Transit Co., with office at St. Louis, Mo., succeeding J. F. Deaderick, resigned.

The title of C. H. Beatty, superintendent of the Salt Lake & Ogden at Salt Lake City, Utah, has been changed to general superintendent and the office of superintendent is abolished.

T. F. Sharp has been appointed assistant superintendent of the Victoria division of the Galveston, Harrisburg & San Antonio, with office at Victoria, Tex., succeeding E. J. Nichols, resigned.

W. H. Guild, secretary to the vice-president and general manager of the Oregon Railroad & Navigation Co., has been appointed an assistant superintendent of the Oregon division, with office at Portland, Ore.

H. A. Gausewitz, superintendent of the Fort Worth & Denver City at Childress, Tex., has been appointed general superintendent, with office at Fort Worth, Tex., succeeding G. F. Cotter, resigned to engage in other business.

David L. Bush, general superintendent of the Chicago, Milwaukee & St. Paul at Chicago, has been appointed general manager, with office at Chicago, succeeding W. J. Underwood, resigned. H. B. Earling, general superintendent of the Chicago, Milwaukee & Puget Sound, at Butte, Mont., has been appointed also general superintendent of the Chicago, Milwaukee & St. Paul, with office at Chicago, succeeding Mr. Bush.

G. M. Fraser, whose resignation as traveling passenger agent of the Illinois Central at Salt Lake City, Utah, has been announced in these columns, has been appointed superintendent of the Nevada Copper Belt Railroad, a line now under construction from Wabuska, Nev., to Yerington and Mason City. Mr. Fraser will probably have charge of the traffic department when the line is turned over to the operating department.

R. M. Leech, superintendent of the San Luis Potosi division of the National Railways of Mexico, has been appointed superintendent of both the Mexico and the Queretaro divisions, including all branches, with office in Mexico City, succeeding A. B. Newell, superintendent of the Mexico division, resigned to become president of the Tennessee Central; also succeeding E. W. Bowmans, superintendent of the Queretaro division, transferred to the San Luis Potosi division, with office at San Luis Potosi.

Traffic Officers.

R. S. Gilbert, soliciting freight agent of the Southern Indiana at Terre Haute, Ind., has resigned to go into other business.

T. M. Bell has been appointed a traveling freight agent of the Ann Arbor Railroad & Steamship Lines, with office at Toledo, Ohio.

Harry E. Moores, general agent in the passenger department of the Wabash, with office at Omaha, Neb., has resigned, to engage in other business.

B. E. Cook has been appointed a traveling freight agent of the Central of Georgia, with office at St. Louis, Mo., succeeding J. B. Wenger, resigned.

J. H. Anderson, traveling freight agent of the Pere Marquette at Buffalo, N. Y., has been appointed a commercial agent, with office at Cincinnati, Ohio.

Leon Dismuke has been appointed a traveling passenger agent of the Texas & New Orleans, with office at Houston, Tex., succeeding Ely Ensign, resigned.

N. S. Hoskins has been appointed a soliciting freight agent of the Rock Island-Frisco system, with office at New Orleans, La., succeeding A. L. Needham, resigned.

C. E. Bartlett has been appointed a traveling passenger agent of the New York, Chicago & St. Louis, with office at Buffalo, N. Y., succeeding G. F. Latter, transferred.

T. P. Stabler has been appointed a traveling freight agent of the Cleveland, Cincinnati, Chicago & St. Louis, with office at Dayton, Ohio, succeeding A. C. Braun, transferred.

Harry Langmead, soliciting freight agent of the Cincinnati, New Orleans & Texas Pacific at Cincinnati, Ohio, has been appointed a traveling freight agent, effective October 1.

R. W. Weiblen has been appointed a contracting freight agent of the Chicago, St. Paul, Minneapolis & Omaha, with office at St. Paul, Minn., succeeding W. H. McBride, resigned.

C. S. Stephens, traveling freight agent of the Pere Marquette, has been transferred from Chicago to Indianapolis, Ind. H. C. Dithridge, chief clerk at Pittsburgh, Pa., succeeds Mr. Stephens, with office at Chicago.

R. W. Darling, city passenger agent of the Cleveland, Cincinnati, Chicago & St. Louis at Columbus, Ohio, has been appointed a traveling passenger agent of the Missouri Pacific-Iron Mountain system, with office at Cleveland, Ohio.

H. G. Holden, commercial agent of the Wabash at St. Louis, Mo., has been appointed an assistant general freight agent, with office at St. Louis, succeeding W. F. Schmidt, resigned. B. H. Coyle, westbound freight agent at St. Louis, succeeds Mr. Holden.

W. F. Greaves, general southern freight agent of the Cleveland, Cincinnati, Chicago & St. Louis at Birmingham, Ala., has been appointed a division freight agent, with office at Louisville, Ky., succeeding F. H. Wipper, transferred. C. H. Rolf succeeds Mr. Greaves.

J. P. Gardner, general agent of the Louisville, Henderson & St. Louis at Evansville, Ind., has been appointed general freight and passenger agent, with office at Louisville, Ky., succeeding L. J. Irwin, recently elected president. W. L. Mills succeeds Mr. Gardner.

W. R. Haldane has been appointed general freight agent of the Kootenay and Boundary districts of the Canadian Pacific, with office at Nelson, B. C., succeeding R. E. Larmour, transferred. F. H. Clendenning has been appointed an assistant general freight agent, with office at Vancouver, B. C., succeeding W. H. Robertson.

The headquarters of E. J. Naylor, recently appointed general agent, traffic department, of the Toledo, St. Louis & Western and the Chicago & Alton, will be at Los Angeles, Cal., and not at San Francisco, as was reported in these columns last week. George W. Thomas has been appointed southwestern passenger agent, with office at Dallas, Tex., succeeding Mr. Naylor, effective October 1.

Howard J. Ball, general eastern passenger agent of the Delaware, Lackawanna & Western at New York, on account of ill health has been appointed a passenger agent, with office at Philadelphia, Pa., and will report to the general passenger agent for such special assignments as may be desirable. J. L. Smith, division passenger agent at Newark, N. J., succeeds Mr. Ball, with office at New York.

A. Landry, whose appointment as assistant general freight agent of the Gulf, Colorado & Santa Fe, with office at Galveston, Tex., has been announced in these columns, was born September 4, 1871, at New Orleans, La. He received a high school education in New Orleans and began railway work in March, 1899, with the Louisville, New Orleans & Texas, now the Yazoo & Mississippi Valley. He entered the service of the Gulf, Colorado & Santa Fe at New Orleans October 1, 1892,

being promoted to the general agency March 15, 1897, which position he held until his recent appointment as assistant general freight agent.

F. B. Bowes, freight traffic manager of the Illinois Central at Chicago, has been given the title of general traffic manager in charge of the freight department, which includes the industrial department. Donald Rose, assistant to the president, succeeds to the title of Mr. Bowes. W. E. Keepers, general freight agent at Chicago, has been placed in charge of the interchange freight business of the company and outside agencies, with no change of title. V. D. Fort, assistant general freight agent at Chicago, has been appointed general freight agent of the northern and western lines, succeeding to the duties of Mr. Keepers. J. H. Cherry has been appointed an assistant general freight agent of the northern and western lines, with office at Chicago.

The organization of the traffic department of the Pennsylvania Lines West of Pittsburgh is as follows: James P. Orr, assistant freight traffic manager of the Northwest system, is appointed general freight agent, with office at Pittsburgh, in charge of all freight traffic pertaining to the Pennsylvania Company (Northwest system) excepting iron ore, coal and coke. M. S. Connelly, general freight agent of the Southwest system, with office at Pittsburgh, has charge of all freight traffic pertaining to the Pittsburgh, Cincinnati, Chicago & St. Louis (Southwest system), excepting iron ore, coal and coke. C. F. Perkins has been appointed general ore and coal agent, with office at Pittsburgh, in charge of iron ore, coal and coke traffic pertaining to both companies. U. G. Couffer, chief of the tariff bureau, has charge of the compilation and publication of all freight tariffs, division sheets and percentages of both companies. E. E. Wright, freight claim agent, with office at Pittsburgh, has charge of the investigation and adjustment of claims for loss, damage, overcharge, etc., for both companies.

Engineering and Rolling Stock Officers.

M. G. Brown has been appointed master mechanic of the Gulf & Ship Island, with office at Gulfport, Miss., succeeding H. H. Hale, resigned to accept service with another company.

Frank Lane, whose appointment as electrical engineer of the Wabash, has been announced in these columns, was born February 24, 1875, in Cape Girardeau county, Mo. He received his education at the Cape Girardeau high school and state normal school. From 1890 to 1907 he was employed by various electric light and power and telephone companies in Missouri, acting in the capacity of superintendent and at times having charge of construction work. In 1907 he was appointed chief engineer and electrician of the Wabash at Moberly, Mo., which position he held until his recent appointment as electrical engineer, with office at Decatur, Ill.

Special Officers.

J. O. Dalzell, assistant general freight agent of the Northern Pacific at St. Paul, Minn., has been appointed assistant land commissioner of the Northern Pacific and the Northwestern Improvement Company, with office at St. Paul, Minn.

OBITUARY.

James J. Hagerman, formerly president of the Colorado Midland and the Pecos Valley & Northeastern, died September 14 at Milan, Italy. Mr. Hagerman was born in 1838 at Port Hope, Canada. He graduated from the University of Michigan in 1861 and began business life in the iron and steel industry in Michigan. In 1883 he was in ill health and went to Colorado Springs, beginning railway work in 1887. From 1887 to 1888 he was president of the Colorado Midland, having organized this company and built the road from Colorado Springs, Colo., to Aspen. Beginning in 1890 he built the Pecos Valley Railway in New Mexico, from Pecos City, N. Mex., to Eddy, and in 1894 extended this line to Roswell, N. Mex. He was also for many years president and director of the Pecos Valley and its successor, the Pecos Valley & Northeastern. Mr. Hagerman also had a large interest in Colorado mining properties and was one of the wealthiest men in the state.

Railroad Construction.

New Incorporations, Surveys, Etc.

Alabama Roads (Electric).—The Gadsden (Ala.) Business Men's Club, associated with Chicago capitalists, are said to be back of a project to build an electric line from Gadsden southeast to Jacksonville, 22 miles.

Albany Southern (Electric).—The New York Public Service Commission, Second district, has granted permission to this company to issue bonds. Proceeds amounting to $765,000 are to be used for buying the Albany & Greenbush bridge and $485,000 is for improvements. The company expects soon to start grading work for second track. (Sept. 17, p. 520.)

Bandon-Port Orford Railroad & Navigation Co.—This company is being organized by residents of Bandon, Ore., to build about 26 miles of line from Bandon south to Port Orford. Survey is said to be made and work is to be started in September.

Bartlett & Florence.—An officer writes that a large grading force is now at work from Bartlett, Tex., west to Florence, 23 miles. It is expected to have the line in operation by January, 1910. The company is now in the market for rails and equipment. J. C. Collins, secretary, Bartlett, Tex. (Sept. 17, p. 520.)

Brookville & Mahoning.—See Pittsburg, Shawmut & Northern.

Canadian Northern Ontario.—According to press reports bids are to be let at once for building 130 miles between Toronto and Ottawa of the new line projected from Niagara Falls, Ont., northwest to Hamilton, thence northeast via Toronto to Ottawa. The route from Ottawa east will be from a point on the Sudbury line, near Duncan, northeast via the high lands, through Orono and Hampton to Port Hope and Cobourg on Lake Ontario, crossing the Grand Trunk at Brighton, thence via Belleville and Smith's Falls to Ottawa, where it will join the line building east to Hawkesbury, connecting with the line to Montreal, Que. (July 30, p. 215.)

Chicago & North Western.—The Sparta & North Western, recently incorporated in Wisconsin, has applied to the Wisconsin Railroad Commission for a certificate of public convenience and necessity to build from Lindwurm (Milwaukee) northwest through Wauwatosa, West Allis, Greenfield and Granville, in Milwaukee county; Menominee, Lisbon, Merton and Oconomowoc, in Waukesha county; Ashippun and Emmet to Clyman, in Dodge county, about 50 miles. The line is eventually to be extended west to Sparta and will provide a short route for the C. & N. W. between Chicago and Milwaukee to Minneapolis, Minn., and St. Paul. This is to be accomplished by building an extension from Clyman northwest to the Chicago & North Western line at Necedah and then building a short line from Wyeville west to Sparta. (Aug. 13, p. 297.)

Chicago, Rock Island & Gulf.—An officer writes that surveys have been made from Graham, Tex., west to Stamford, about 80 miles, but that it is undecided whether the line will be built.

Concho, San Saba & Llano Valley.—Incorporated in Texas to build from San Angelo, in Tom Green county, Tex., southeast to San Antonio, about 235 miles. An officer writes that the line was opened on September 15 from Miles to Shawnee, 6.5 miles, and it is expected to open the first 16.5 miles from Miles southeast to Paint Rock on October 1. At Miles connection is to be made with the Gulf, Colorado & Santa Fe. R. A. Love, vice-president and general manager, Miles. (April 16, p. 871.)

Coshocton, Otsego & Eastern.—Incorporated in Ohio, with $10,000 capital and office at Cleveland, Ohio. The plans call for building 118 miles of line from a point on the Wheeling & Lake Erie near Coshocton, Ohio, westerly. The incorporators include: J. M. Drake, J. W. Warwick, C. L. Cassingham and W. B. Kennedy.

Des Chutes Railroad.—See Union Pacific.

EL PASO & FORT HANCOCK (ELECTRIC).—Incorporated in Texas, with $100,000 capital, to build from El Paso, Tex., southeast via Ysleta, Socorro, San and Elizario to Fabens, in El Paso county, about 30 miles. The incorporators include: C. E. Kelly, R. Caples, W. B. Latta, F. Martinez, T. O'Keefe and R. F. Burgess, of El Paso.

FLORIDA EAST COAST.—According to press reports the extension being built from Miami, Fla., southwest along the Florida keys to Key West, 157 miles, will be finished and the entire line opened for operation early in 1910. The most difficult sections have been finished. The work now under way is on the last section between Knight's Key and Key West, 45 miles. The line was opened south to Knight's Key in February, 1908, from which place steamer service is now in operation to Havana, Cuba. (March 19, p. 654.)

FORT WORTH & RIO GRANDE.—According to press reports surveys have been finished and work is to be started soon on an extension from Brady, Tex., south to San Antonio, about 150 miles.

FORT WORTH, MINERAL WELLS & WESTERN (ELECTRIC).—Incorporated in Texas, with $100,000 capital and office at Fort Worth, to build from Fort Worth west through Tarrant, Parker and Palo Pinto counties to Mineral Wells, thence to Roswell, N. Mex., in all about 400 miles. The incorporators include: J. A. Watkins, Little Rock, Ark; J. S. Handford, Beaumont, Tex., and L. C. Cole, Fort Worth.

FRANKLIN & CLEARFIELD.—See Lake Shore & Michigan Southern.

GRAND TRUNK PACIFIC.—An officer writes that track has been laid on the main line from Winnipeg, Man., west for 860.5 miles to the Pembina river, in Alberta and that about 300 miles has been fully ballasted and trimmed, and the balance has received the first lift of ballast. Sidings have been laid on 78 miles.

Contract for grading the section of the main line from Wolf creek, Alb., westerly for 179 miles, and from Copper river at mile 100, east of Prince Rupert, east to Aldermere, about 135 miles, has been let to Foley-Welch & Stewart, of Stony Plain, Alb., and Prince Rupert, B. C.

A branch line from the second terminal on the main line at Melville, Sask., is under construction south, on the first 33 miles towards Regina. Contract for the grading has been let to McMillan Brothers & Kenny, of Winnipeg, Man., and this work is about finished. Five miles of track has been laid on this branch.

From Melville work is under way on the first section of 25 miles of a branch north towards Yorkton. It is expected that this section will be finished this month. Rigby, Hyland & Plummer, of Winnipeg, Man., are the contractors.

Surveys are being made for a branch from the main line at Tofield, Alb., southerly towards Calgary, and contract for grading work on the first 50 miles has been let to J. D. McArthur, of Winnipeg, Man.

Contracts have been let to Smith Brothers & Wilson for 21 frame station buildings, each 26 x 60 ft., and to the Carter-Halls-Aldinger Co., Ltd., of Winnipeg, Man., for the construction of a steel roundhouse and machine shop at Edmonton, Alb.

The Canadian Bridge Co., of Walkerville, Ont., is putting up a large steel bridge at the Pembina river in Alberta, which it will take from two to three months to finish. The same company also has contracts for putting up steel bridges over Wolf creek, 915 miles west of Winnipeg and another over the McLeod river at a point 915.5 miles west of Winnipeg. They have also been given contracts for putting up six permanent structures on the first 100-mile section from Prince Rupert, B. C., east.

Contracts have been let to Charles May, of Edmonton, for the substructures of the bridges crossing Wolf creek and the McLeod river and to Charles H. Ferguson for the substructures of bridges on the section east of Prince Rupert, at several points as follows: Zanardi Rapids, Ka-it-siks, Ex-chom-siks, Ecstews, Zim-a-cord and at Kit-sum-kay-lum, which are, respectively, eight miles, 55 miles, 60 miles, 72 miles, 87 miles and 91 miles east of Prince Rupert, B. C.

Announcement is said to have been made by an officer of the National Transcontinental Railway Commission that track laying on the section of the Grand Trunk Pacific from Superior Junction, Ont., west to Winnipeg, is almost finished, although considerable work remains to be done to the roadbed to put the line in standard condition. The line may be used next month for moving the crops east in connection with the branch from Superior Junction southeast to Fort William.

GREAT NORTHERN.—Contracts are said to have been let for building the line from Great Falls, Mont., east to Belt, about 22 miles. The work includes piercing a tunnel 1,600 ft. long, to cost about $1,000,000. The new line will eliminate the heavy grades on the existing line between Gerber and Belt. (Aug. 22, p. 339.)

Contract is said to have been given to A. Guthrie & Co., Minneapolis, Minn., for building from Oroville, Wash., down the valley of the Okanogan river to Brewster, about 60 miles. (Aug. 27, p. 383.)

GREEN BAY & WESTERN.—An officer is quoted as saying that the section from Marshland Junction, Wis., across the Mississippi river to Winona, Minn., five miles, will in future be operated by electricity furnished by the La Crosse Water Power Co.

HUDSON VALLEY (ELECTRIC).—The New York State Public Service Commission, Second district, has approved the abandonment of a part of the route of this road along the Waterford and Whitehall turnpike near the Champlain canal and the south branch of the Hudson river, also the main branch of the Hudson and the power canal of the American Box Board & Power Co. This action is being taken because of the location of the bridge canal through that section, and a new line is to be built to replace the abandoned one on a new location.

IDAHO SOUTHERN.—Contract is said to have been given to Donald & Grant, for building an extension from Jerome, Idaho, south to Twin Falls. The company now operates 24 miles of line from Gooding, southeast to Jerome and when the improvements are finished will furnish a cut-off line for all points north and south of the Snake river.

INTERSTATE RAILWAY (ELECTRIC).—The Electric Traction Construction Co., Commerce building, Kansas City, Mo., is asking for bids to build from Kansas City north to St. Joseph, 48½ miles. There are to be 24 bridges on the line. Bids also wanted for a concrete power house to be built in St. Joseph at a cost of $400,000. E. D. Martin, president, and N. C. Van Natta, chief engineer, 301 Commerce building, Kansas City. (July 16, p. 125.)

KANSAS CITY, MEXICO & ORIENT.—An officer writes that it is expected to have the remaining 78 miles from Sweetwater, Tex., south to San Angelo finished and the line from Wichita, Kan., in operation south to San Angelo, 510 miles, by October 1, a total of 859 miles in operation on the entire road. It is expected to have about 900 miles in operation before the end of 1909. At San Angelo a freight station was recently finished at a cost of $15,000 and a passenger station is nearing completion at a cost of $35,000. Work will be started in a few weeks on large stock pens, coal chute, etc. (May 14, p. 1051.)

LAKE SHORE & MICHIGAN SOUTHERN.—An officer writes that it is expected to open the new Franklin & Clearfield branch from Franklin, Pa., southeast to Brookville, 62 miles, for freight service on September 26. It has not been decided when passenger service will be started. (Aug. 13, p. 296.)

LONG ISLAND.—Work on the reconstructed line from Jamaica, L. I., to Long Island City has been finished and trains are now in operation.

MICHIGAN CENTRAL.—The last section of the Michigan Central tunnel under the Detroit river between Windsor, Ont., and Detroit, Mich., was sunk into place on September 14. It is expected that the twin tubes will be open for traffic on January 1, 1910. Butler Brothers-Hoff Co., of New York, were the contractors.

MILWAUKEE, SPARTA & NORTH WESTERN.—See Chicago & North Western.

MISSOURI RIVER, CARROLTON & NORTH WESTERN.—Organized

with $500,000 capital and office at Carrolton, Mo., to build from the Missouri river northwest to Kingston, about 40 miles. Preliminary surveys are said to have been made. H. Ely, president, of Carrolton.

Montreal Valley.—Incorporated in Wisconsin, with $100,000 capital, to build a line from a point near Myers, in Iron county, Wis., northeast to Ontonagon, Mich., 70 miles, of which one and one-half miles are to be in Wisconsin. The incorporators include: M. A. Meyers, David H. Jack, Harry M. Jack, Thomas E. Lyons and William B. Perry.

Mountain Valley & Plains.—Organized to build from Cimarron, N. Mex., east through the Pan-Handle of Texas, to Guthrie, Okla., about 450 miles. An officer is quoted as saying that construction work is to be started by February 10 on the first section from Guthrie west, and it is expected to have the line finished to Higgins, Tex., about 250 miles, in two years. J. H. Conlan, chief engineer, Dalhart. (Aug. 20, p. 339.)

National Railways of Mexico.—According to press reports this company has already bought material to be used in building the first 50 miles of the proposed extension of the Mexican International from Durango southwest to Mazatlan, on the Pacific coast. The new line, in addition to furnishing a direct route to the Pacific coast, will open up a large tract of pine timber lands owned by the Campania Madetera de la Sierra of Durango. The state of Durango and the lumber company have entered into a contract with the railway guaranteeing the interest on the original investment at the rate of 6 per cent.

New York, New Haven & Hartford.—An officer of the New York, Westchester & Boston tells us that bids are wanted about October 1 for building the line from Mount Vernon, N. Y., to White Plains, nine miles. Most of the right-of-way has been secured. (July 23, p. 168.)

New York, Westchester & Boston.—See New York, New Haven & Hartford.

Orange & Northwestern.—See St. Louis & San Francisco.

Oregon & Washington.—See Oregon Railroad & Navigation Co.

Oregon Railroad & Navigation Co.—The Oregon & Washington, building from Portland, Ore., north to Tacoma and Seattle, Wash., 230 miles, is being graded to a connection with the Chicago, Milwaukee & Puget Sound, near Gate City, and track laying was started west from Gate City on September 10. A section of 11 miles from Gate City southeast to Centralia is finished and work has been started on the Argo yards, where the company is pushing the work to develop terminal facilities. Bids for the construction of a new passenger station at Seattle were received September 15, and work on that structure is to be started at once. Work is under way on a tunnel to be 8,650 ft. long at Tacoma. Of this 1,650 ft. had been excavated up to September 8, and the work was progressing at the rate of 28 ft. a day from one end only. The company expects to have 60 miles finished west of Gate City by January 1, 1910. (March 19, p. 656.)

This company is now building a tunnel, to be 5,425 ft. long, at Portland, Ore., to connect the O. R. & N. with the O. & W. Contracts let to the Pacific Bridge Co. and Robert Wakefield Porter. The tunnel will extend from the O. R. & N. in Mock's Bottom, near St. John, northerly to a connection with the Spokane, Portland & Seattle's Columbia river bridge, just south of the Columbia Slough. This bridge is to be used jointly by the Harriman and Hill lines. The tunnel and approaches at this place will cost $800,000.

Pacific & Eastern.—According to press reports a contract has been given to Porter Brothers for an extension from Eagle Point, Ore., east to a point in the Cascade mountains, 20 miles. (July 23, p. 169.)

Piedmont-Carolina.—Organized to build from Salisburg, N. C., south via Chinagrove, Landis and Glass to Concord, 30 miles. W. F. Snider, president, and T. W. Vonderford, general manager.

Pittsburg & Shawmut.—See Pittsburg, Shawmut & Northern.

Pittsburg, Shawmut & Northern.—An officer writes that the Pittsburg & Shawmut, formerly the Brookville & Mahoning, recently gave a contract to J. H. Corbett, of Moncton, N. B., and Kittanning, Pa., to extend the line already built from Brockwayville, Pa., south to Knoxdale, south along Mahoning creek to Mahoning, Pa., thence over the Allegheny river and along the west bank to Freeport. The work will be heavy and includes six tunnels. The principal bridge will be over the Allegheny river at Mahoning. The maximum grade northbound will be 6/10 of 1 per cent. The line will traverse coal fields, estimated to furnish the line with a maximum tonnage of 1,800,000 tons annually. The officers of the Pittsburg & Shawmut are Edwin E. Tate, president, Bradford; George C. Dwight, vice-president and general manager, and W. W. Henshey, chief engineer, both of Kittaning.

Rome & Osceola.—According to press reports work has been started on this line, projected from Rome, N. Y., north to Osceola, about 30 miles. W. P. White, president, Utica. David Swancott is a member of the board, of Lee, N. Y. (March 19, p. 657.)

St. Louis & San Francisco.—According to press reports plans are being made to build an extension of the Orange & Northwestern from Newton, Tex., north to Hemphill, about 30 miles, the work to be started this year.

Sioux City & Spirit Lake (Electric).—Organized to build from Sioux City, Iowa, northeast to Spirit Lake, 108 miles. Contract let some time ago to the Westinghouse, Church, Kerr Co. According to press reports the original route has been changed on a section of the line which is now to run from Primghar, in O'Brien county, west via Granville thence south to the north line of Plymouth county, instead of via Paullina and Germantown. All of the right-of-way has been secured, except a section in Plymouth county. Frank Patch, president, and L. F. Wakefield, chief engineer, Morgan block, Sioux City. (March 19, p. 658.)

Stamford & Northwestern.—See Wichita Valley. (March 19, p. 658.)

Texas Roads.—According to press reports it is expected to have the necessary $100,000 raised this month to insure the building of the line projected by Colonel Morgan Jones from San Angelo, Tex., south and west through Tom Green county. It is believed the line will eventually be extended south via Eldorado to Sonora.

Texas Short Line.—According to press reports this company, now operating nine miles of line in Texas, is to be extended from a point near Alba, Tex., north to Paris, 75 miles.

Union Pacific.—Contract has been given to Twohy Brothers, of Spokane, Wash., and work was begun September 1 on the Des Chutes Railroad, building from a connection with the Oregon Railroad & Navigation Co. at the mouth of the Des Chutes river, in Sherman county, Ore., south to Redmond, in Crook county, 130 miles. Of this 80 miles will be in a canyon of the Des Chutes river, from which place it will follow Trout creek. One thousand men were at work on September 11, and this force is to be increased to 2,000 men as rapidly as possible.

Uvalde Street Railway.—An officer writes that the company has under consideration the question of extending its line from Uvalde, Tex., southeast to Batesville, in Zanala county, about 25 miles. The line is to be built if the company receives bonuses and rights-of-way already asked for. M. M. McFarland, general manager, Uvalde.

Wichita Valley.—An officer writes that the section of the Stamford & Northwestern, from Stamford, Tex., west to Jayton, 58.5 miles, was opened for operation on September 15 as a part of the Wichita Valley Railway.

Wisconsin Roads.—Surveys are said to be under way for a line from Penokee, Wis., on the Minneapolis, St. Paul & Sault Ste. Marie, to a new iron mine on the Penokee range. C. C. Lloyd, of Milwaukee, is in charge of surveys. T. H. Gill, of Milwaukee; G. T. Jones, of Iron Mountain, and G. Wilkinson, of Ashland, are said to be interested.

Railroad Financial News.

ALBANY & SOUTHERN (ELECTRIC).—The incorporation of this company, successor of the Albany & Hudson, was announced last week, p. 520. The New York State Public Service Commission, Second district, has authorized the company to issue its common capital stock to the amount of $1,375,000, and its 5 per cent. non-cumulative preferred stock to the amount of $2,029,000. The stock is to be issued only for the acquisition of the properties, rights and franchises of the Albany & Hudson. The company is further authorized to issue its first mortgage, sinking fund gold bonds to the amount of $1,250,000, said bonds to be sold at not less than 85 and the proceeds to be used; $765,000, par value, for acquiring the total outstanding stock of the Albany & Greenbush Bridge Company for the sum of $650,000; the proceeds of the amount to the amount of $485,000, par value, in the acquisition of property and improvement of its facilities, namely, in acquiring additional power plant, building a second track from Rensselaer to Kinderhook lake, and straightening and improving the line between said points. The commission consents to the issuance to the Manhattan Trust Company of a mortgage upon all the company's property to secure the payment of bonds to the amount of $1,500,000.

BOSTON RAILROAD HOLDING COMPANY.—The last measure preliminary to the final transfer of the 110,000 shares of Boston & Maine stock, the "Billiard stock," to the Boston Railroad Holding Company was approved by the Massachusetts Railroad Commission Sept. 18. The commission granted the holding company authority to issue 16,492 shares of additional stock, with a par value of $100, increasing the present outstanding stock of $100,000 to $1,749,200. This new stock is to be given, together with $13,743,500 of 4 per cent. bonds, in the payment for the shares of Boston & Maine stock, thus bringing the controlling interest in the Boston & Maine under the jurisdiction of the state of Massachusetts.

CHICAGO, MILWAUKEE & ST. PAUL.—At the annual meeting of the stockholders in Chicago this week John D. Ryan, president of the Amalgamated Copper Co., was chosen as a director to succeed H. H. Rogers, deceased, and D. G. Geddes was chosen in place of his father, Peter Geddes.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—The directors, at a meeting this week adopted a resolution providing for an issue of $20,000,000 bonds. The proposition will be submitted to a vote at the annual meeting of the stockholders on October 27 in Cincinnati. It is understood that not over $10,000,000 is proposed to be issued at present, this sum to be used to pay for improvements made and planned. Of the cost of improvements already made the Lake Shore & Michigan Southern has advanced about $5,000,000, and this sum is to be paid back out of the proceeds of the new bond issue. A portion of the total issue is to be used to pay off $5,000,000 in notes, which will mature on June 1, 1911. James Stillman was chosen a member of the board in place of James Barnett, resigned.

DETROIT, TOLEDO & IRONTON.—In the United States district court at Detroit last week arguments were heard in the suit brought by the Knickerbocker Trust Co., of New York, trustee for bonds of the road, to secure the bondholders' rights in $9,357,000 of bonds. The United States Mortgage & Trust Company is also a party to the suit, being trustee in the mortgage under which $5,000,000 of D., T. & I. bonds and $5,000,000 of Ann Arbor Railroad Company stock were pledged to secure $5,500,000 of D., T. & I. notes, which notes represent the purchase price of the Ann Arbor stock. James Ramsey, chairman of a committee of noteholders of the D., T. & I., is also a party. It is contended by the interests opposing the present foreclosure proceedings that no foreclosure can be made on the $5,000,000 of bonds pledged with the United States Mortgage & Trust Company for the reason that it represents the purchase price of the Ann Arbor Railroad and that under the railway law of Michigan one railway cannot acquire the stock of another. F. J. Lisman & Co., of New York, who, with other parties, object to the management of the road as now carried out, assert that the proper steps were not taken under the mortgage to have the $5,000,000 of bonds issued.

HOCKING VALLEY.—Press despatches say that an agreement has been reached with the trustees of the Pomeroy Belt Railway to sell the belt line to the H. V. for $100,000. This will give entrance to the coal fields east of Pomeroy.

LAKE SHORE ELECTRIC.—The sale of $1,200,000 general mortgage 5 per cent. bonds of the company is announced, the proceeds to be used to pay off the entire floating debt. President Moore says that the company will have no further capital requirements to meet for a long time. The road is now in condition to handle an increase of 30 per cent. or more in traffic. It has a surplus of power from which it is supplying two connecting roads, and the track and equipment are declared to be in excellent shape.

MISSOURI, KANSAS & TEXAS.—This company has before the Court of Claims at Washington a suit to recover from the government $61,287,800 on account of lands granted to the road but not conveyed. The suit is one of the largest ever presented to this court and was brought some time ago by filing a petition in which it was alleged that by acts of Congress the United States had agreed to convey to the road the fee simple title to every alternate section of land to the extent of ten sections a mile on each side of its line through the Indian Territory and Kansas, and that later many of these lands had been deeded to the Indians in severalty and had otherwise been disposed of, to the great loss of the railway company.

SECOND AVENUE (ELECTRIC).—Receiver G. W. Linch, operating this New York city surface street railway, has been authorized by the court to borrow $500,000 on 6 per cent. receiver's certificates for the purpose of making improvements, including the reconstruction of a car house, which was destroyed by fire; the construction of six crossover tracks and the rebuilding of a considerable length of main tracks. It is proposed to electrify the line on Worth street between Chatham square and Broadway.

Uruguay Pan-American Railway.

The United States consul at Montevideo reports that the contract has been signed between the government of Uruguay and the Pan-American Trans-Continental Railway for the construction of a railway from the northern border of that republic to its southern border at Colonia. The line is part of a plan to secure rapid transit between New York and Pernambuco, Brazil, by high-speed steamers, thence by rail to Valparaiso via Rio Janeiro and Buenos Aires. The greater portion of this railway is finished and in operation, there remaining to be completed about 25 miles in southern Brazil and the projected section of 373 miles through Uruguay, with some 13 miles between Argentina and Chile, making a total of about 400 miles. The Uruguay portion, 378 miles long, to be called "The Interior Railway of Uruguay," starts on the Brazilian border at San Luis, passes through an agricultural region rich in minerals to Trinidad, thence to Colonia, on the river Plate, opposite to and 26 miles from Buenos Aires, where the terminals will include docks, warehouses and elevators, the depth of water allowing large ocean steamers to load and discharge cargoes. The republic of Uruguay guarantees a minimum interest of 3½ per cent. on an expenditure of $43,000 per mile of a line between Trinidad and San Luis, 248 miles, no deduction to be made in payment of the full guaranty unless the net profits earned by the railway exceed 1½ per cent. a year. The existing railways of Uruguay are operated at a profit, most of them, on 50 per cent. of the gross receipts. When the net profits exceed 6 per cent. the company must hand over to the government two-thirds of such excess, and all exceeding, until all guaranteed interest advanced is paid. All profits exceeding 8 per cent. are handed over to the government, or the tariffs are reduced, at the option of the government; but if the reduced profits fall below 8 per cent. the government is to make good the deficiency. The concession is for 90 years, the minimum interest being guaranteed for the first 35 years.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Detroit & Mackinac has ordered one six-wheel switcher from the American Locomotive Co.

The Kewaunee, Green Bay & Western has ordered one locomotive from the American Locomotive Co.

The Idaho Southern has ordered one eight-wheel passenger locomotive from the American Locomotive Co.

The Terminal Railroad Association of St. Louis will buy two Mallet compounds and five switching engines.

The American Steel Foundries have ordered one four-wheel saddle tank locomotive from the American Locomotive Co.

The Atchison, Topeka & Santa Fe has ordered from the Baldwin Locomotive Works 18 Atlantic engines, as reported in the *Railroad Age Gazette* of September 17.

The Quincy Western, Quincy, Cal., has ordered from the American Locomotive Co. one 17-in. x 24-in. Forney locomotive, for which it was in the market as mentioned in the *Railroad Age Gazette* of September 3.

The Baltimore & Ohio, as reported in the *Railroad Age Gazette* of September 10, has ordered 26 simple Atlantic locomotives from the Baldwin Locomotive Works and 34 simple consolidation engines from the American Locomotive Co.

General Dimensions.

	Atlantic.	Consolidation.
Type of locomotives.	Atlantic.	Consolidation.
Weight on drivers	115,000 lbs.	194,000 lbs.
Total weight	190,000 "	217,000 "
Cylinders	22 in. x 26 in.	22 in. x 30 in.
Diameter of drivers	80 in.	66 in.
Type of boilers	Straight.	Straight.
Working steam pressure	205 lbs.	205 lbs.
Heating surface, tubes	.....	2,612.8 sq. ft.
" " firebox	.....	179.4 "
" " total	.....	2,792.1 "
Tubes, number	.....	280
" outside diameter	2¼ in.	2¼ in.
" length	.....	15 ft. 8¾ in.
Firebox, type	Wide.	Wide.
" length	.....	108⅛ in.
" width	.....	75¼ "
" material	.....	O. H. steel.
Grate area	.....	56.24
Tank capacity, water	7,000 gals.	7,000 gals.
Coal capacity	15 tons.	15 tons.

Special Equipment.

Axles	Open-hearth steel
Bell ringer	Ochse (Atlantic only)
Boiler lagging	Magnesia
Brakes	Westinghouse
Brake-beams	Diamond special
Brake-shoes	Am. Brake-Shoe & Fdry Co.
Couplers	Simplex (Consolidation only)
Driving boxes	Cast steel, Elvin lub.
Headlight	Dressel (Consolidation only)
Journal bearings	B. & O. bearings
Piston and valve-rod packings	U. S. Metallic
Safety valve	Coale
Sanding devices	Hanlon
Sight-feed lubricators	Nathan (Consolidation only)
Springs	Union Spring Co. (B. & O. special)
Staying	Radial
Steam gages	Ashcroft
Steam heat equipment	Gold
Valve gear	Walschaert
Wheel centers	Cast steel

The Delaware & Hudson has ordered from the American Locomotive Co. six Mallet compound (0-8-8-0). The inquiry for this equipment was mentioned in the *Railroad Age Gazette* of September 10.

General Dimensions.

Weight on drivers	441,000 lbs.
Cylinders	26 in. and 41 in. x 28 in.
Diameter of drivers	51 "
Type of boiler	Wide firebox, conical type
Working steam pressure	220 lbs.
Heating surface, tubes	5,492 sq. ft.
" " firebox	350 "
" " total	5,842 "
Tubes, number	446
" outside diameter	2¼ in.
" length	21 ft.
Firebox, type	Wide
" length	126⅛ in.
" wide	114 "
" material and maker	Homogeneous firebox, steel carbon acid
Grate area	100 sq. ft.
Tank capacity for water	9,000 gals.
Coal capacity	14 tons

Special Equipment.

Axles	Steel, Cunningham treated
Bell ringer	Sanson
Boiler lagging	K. & M. magnesia sectional
Brakes	Westinghouse
Brake-beams	Tender, Hercules; Amer. Steel Fdry.
Brake-shoes	Tender, Diamond "S"; driver, Perfecto steel back
Brick arch	None
Couplers	Climax
Driving boxes	Cast steel
Flange lubricators	Drivers, Chicago
Headlight	Dressel
Injector	Hancock
Journal bearings	Cyprus bronze, Elvin hard grease cellars
Piston and valve-rod packings	Trojan
Safety valve	Consolidated
Sanding devices	Hanlon pneumatic
Sight-feed lubricators	Cylinder and valve; Ohio
Springs	Union Spring & Mfg. Co.
Staying	Firebox and crown; Taylor iron
Steam gages	Ashcroft
Steamheat equipment	None
Superheater	None
Tires	Midvale
Tubes	Spellerized steel
Valve gear	Walschaerts
Wheel centers	Cast steel

The Grand Trunk, as reported in the *Railroad Age Gazette* of August 27, has ordered 25 simple moguls from the Canadian Locomotive Co. and 15 Richmond compound consolidation locomotives from the Montreal Locomotive Co., both types being for January and February, 1910, delivery. The details of the 10 Pacific engines ordered from the company's own shops are not yet worked out. Specifications for the other locomotives follow. The moguls will have brick arches, but the consolidation engines will not. Neither type will have superheaters.

General Dimensions.

	Mogul.	Consolidation.
Type of locomotive	Mogul.	Consolidation.
Weight on drivers	115,000 lbs.	184,800 lbs.
Total weight	136,000 "	211,200 "
Cylinders	19 in. x 26 in.	22½ & 35 in. x 32 in.
Diameter of drivers	63 in.	63 in.
Type of boiler	Ext. wagn top.	Ext. wagn top.
Working steam pressure	180 lbs.	210 lbs.
Heating surface, tubes	1,551.5 sq. ft.	2,757.1 sq. ft.
" " firebox	160.2 "	168.2 "
" " total	1,711.7 "	2,925.3 "
Tubes, number	266	353
" outside diameter	2 in.	2 in.
" length	10 ft. 10 in.	15 ft.
Firebox, type	Long & narrow.	Wide
" length	108¼ in.	96⅞ in.
" width	40¾ "	75¼ "
" material	Steel.	Steel.
Grate area	30 sq. ft.	50.62 sq. ft.
Tank capacity, water	6,000 U.S. gals.	7,000 U.S. gals.
Coal capacity	10 tons.	10 tons.

Special Equipment.

Axles	Steel
Bell ringer	G. T. R.
Boiler lagging	Air cell magnesia (mogul) wood and asbestos (consolidation)
Brakes	Westinghouse
Brake-beams	G. T. R.
Brake-shoes	Perfecto (mogul only)
Couplers	Washburn or Melrose
Draft gear	Miner (on tender)
Driving boxes	Cast steel, with grease cellars (mogul), cast steel (consolidation)
Headlight	G. T. R.
Injector	Hancock
Piston and valve rod packings	U. S. Metallic
Safety valve	World
Sanding devices	Hand
Sight-feed lubricators	G. T. R.
Springs	Peach & Tozer steel (mogul), U. S. Steel Prod. Export Co. (consolidation)
Staying	Radial
Steam gages	Utica
Steam heat equipment	Gold
Tires	Open-hearth on engine, crucible on tender
Tubes	Charcoal iron (mogul), German cold-drawn steel (consolidation)
Valve gear	Stephenson
Wheel centers	Steel (mogul), steel on main and iron on others (consolidation)

CAR BUILDING.

The Louisiana Railway & Navigation Co. is in the market for three chair cars.

The Hilo Railroad, Honolulu, H. I., is in the market for 15 thirty-ton flat cars.

The Toledo & Ohio Central is in the market for 500 thirty-ton steel underframe box cars.

The Gary & Interurban has ordered four electric cars from the McGuire-Cummings Manufacturing Co.

The Oklahoma Railway Co. (*Electric*), Oklahoma City, Okla., is contemplating the purchase of eight combination cars.

The Chicago & North Western will soon receive 300 refrigerator cars which were built by the Haskell & Barker Car Co.

The Northern Pacific is in the market for 500 to 1,000 self-clearing gondolas. The cars are to be all-steel and of 100,000 lbs. capacity.

The Tri-State Oil Co., Bliss building, Tulsa, Okla., is in the market for several tank cars of 8,000, 10,000 and 12,000 gallons capacity.

The Swift Refrigerator Transportation Co. has ordered 1,000 steel underframes from the Chicago Steel Car Co. for use in repairing its cars.

The Lake Superior & Ishpeming is in the market for 200 ore cars in addition to the 50 flats mentioned in the *Railroad Age Gazette* of September 10.

The Interstate Railway Co., Kansas City, Mo., will buy rolling stock within two months. E. D. Martin, president, 301 Commerce building, Kansas City, Mo.

The Texas Traction Co. has ordered three interurban cars from the American Car & Foundry Co. These cars were mentioned in the *Railroad Age Gazette* of July 30.

The Quincy Western, Quincy, Cal., has ordered from the Holman Car Co., San Francisco, Cal., the combination passenger-baggage car mentioned in the *Railroad Age Gazette* of September 3.

The New York Central Lines are figuring on cars for 1910 requirements, but nothing definite has been decided. It has been decided not to buy the 100 flat cars mentioned in the *Railroad Age Gazette* some time ago.

The New York, Ontario & Western is having built at the Middletown shops the 500 forty-ton hopper gondolas mentioned in the *Railroad Age Gazette* of August 27. These cars will measure 33 ft. long, 8 ft. 11 in. wide and 5 ft. 1 in. high, inside measurements, and 34 ft. 6½ in. long, 9 ft. 8 in. wide and 9 ft. 4½ in. high, over all. The bodies will have steel frames with wood siding, and the underframes, which will be of steel, will be built by the Ralston Steel Car Co. The special equipment includes:

Axles	Steel
Bolsters, body	Built up
Bolsters, truck	Cast steel, Am. Steel Foundries
Brakes	Westinghouse
Brake-beams	Buffalo Brake-Beam Co.
Brake-shoes	Am. Brake-Shoe & Fdry Co.
Brasses	Brady
Couplers	Gould
Coupler carrying iron	Flory
Doors	Dunham
Draft gear	Miner
Dust guards	Harrison
End sills	Cast steel, Commonwealth Steel Co.
Journal boxes	Symington
Springs	Railway Steel-Spring Co.
Trucks	Andrews side frame, Barber roller device
Wheels	National Car Wheel Co.

The Baltimore & Ohio, as reported recently, has ordered 500 thirty-five-ton refrigerator cars from the Whipple Car Co., 1,000 forty-ton box cars from the Standard Steel Car Co., to be built at the plant of the South Baltimore Steel & Foundry Co.; 1,000 all-steel coke cars (capacity, 50 tons for coal and ore and 40 tons for coke) from the Standard Steel Car Co., to be built at Butler, Pa.; 1,000 similar coke cars from the Cambria Steel Co., and 500 forty-ton ventilated box cars from the Ralston Steel Car Co. Passenger equipment has been ordered as follows: From the Barney & Smith Car Co., 10 twenty-ton baggage cars, five parlor-cafe cars, seating 18 passengers in the parlor section and 12 in the cafe, and five 15-ton steel postal cars; from the American Car & Foundry Co., 45 coaches, with capacity for 68 passengers, and five combination passenger and baggage cars, with capacity for 40 passengers and 10 tons of baggage. The refrigerator cars will measure 39 ft. ½ in. long, 8 ft. 3½ in. wide and 7 ft. 6¼ in. high, inside, and 40 ft. 4½ in. long, 9 ft. 11 in. wide and 13 ft. 10⅞ in. high, over all. Bodies and underframes will be of wood. The box cars will measure 36 ft. long, 8 ft. 6 in. wide and 8 ft. 1¼ in. high, inside, and 39 ft. 2¾ in. long, 10 ft. 1½ in. wide and 13 ft. 7½ in. high, over all. Bodies will be of wood and underframes of steel. The coke cars will measure 40 ft. 2 in. long, 9 ft. 5 in. wide and 6 ft. 9 7/16 in. high, inside, and 42 ft. 5 in. long, 10 ft. wide and 11 ft. 4 in. high, over all. Bodies and underframes will be of steel. The ventilated box cars will measure 35 ft. 11¾ in. long, 8 ft. 5¾ in. wide and 7 ft. 8¾ in. high, inside, and 39 ft. 2¾ in. long, 10 ft. 1¾ in. wide and 13 ft. 9⅛ in. high, over all. Bodies will be of wood and underframes of steel. The baggage cars will measure 59 ft. 2½ in. long and 9 ft. ¾ in. wide, inside, and 62 ft. 3¾ in. long, 10 ft. ¼ in. wide and 14 ft. 2½ in. high, over all. Bodies will be of wood and underframes of steel. The parlor cafe cars will measure 8 ft. 8½ in. wide, inside, and 80 ft. 6¾ in. long, 10 ft. ¼ in. wide and 14 ft. 4 5/16 in. high, over all. Bodies will be of wood and underframes of steel. The postal cars will measure 60 ft. long and 9 ft. wide, inside, and 63 ft. ¾ in. long, 10 ft. ½ in. wide and 14 ft. 2¼ in. high, over all. Bodies and underframes will be of steel. The coaches will measure 59 ft. 2½ in. long and 8 ft. 10½ in. wide, inside, and 67 ft. 6¾ in. long, 10 ft. ¼ in. wide and 14 ft. 1 in. high, over all. Bodies will be of wood and underframes of steel. The passenger compartment of the combination passenger and baggage cars will measure 29 ft. 5⅜ in. long and the baggage compartment, 25 ft. 5 in. long, inside. These cars will be 8 ft. 10½ in. wide, inside, and 64 ft. 11¼ in. long, 10 ft. ¼ in. wide and 14 ft. 1 in. high, over all. Bodies will be of wood and underframes of steel.

Special Equipment.

Axles	Open-hearth steel
Bolsters, body	Refrigerators: cast steel
"	Other freight: built up
"	Passenger cars: Commonwealth cast steel
" truck	Passenger cars: Commonw'lth cast steel
Brakes	Westinghouse
Brake-beams	Creco
Brake-shoes	Cast iron with wrought iron inserts
Brasses	B. & O.
Couplers	Passenger: Buhoup
Curtain fixtures	Forsyth
Curtain material	Pantasote
Door fastenings	Box cars: B. & O.
Draft gear	Passenger: Westinghouse; refrigerators: Miner
Dust guards	Bass wood
Heating system	Gold
Journal boxes	Coke cars, (Standard Steel Car Co.): integral with frame; all others: McCord
Lighting system	Pintsch, and wired for electric
Paint	B. & O.
Platforms	Postal: steel; other passengers: Commonwealth cast steel
Roofs	Refrigerators: Hutchins plastic; Box: Murphy; Passenger, except postal: canvas
Seats	Parlor café: B. & O. standard
Seat covering	Plush and Spanish leather
Side bearings	Freight: B. & O.; Passenger: Woods
Springs	B. & O.
Trucks	Coke cars (Standard Steel); Bettendorf; (Cambria): Andrews; other freight: Arch bar; Passenger: Six-wheel, cast steel
Ventilators	Passenger: Deck sash with Universal fixtures.
Vestibules	Parlor café, coach and combination: Wide
Vestibule diaphragms	Acme fireproof
Vestibule trap doors	Edwards
Wheels	Coke (Cambria): 33-in. rolled steel; other freight: 33-in. cast iron; Passenger: 36-in. rolled steel.
Window fixtures	Coaches and combination: Universal

IRON AND STEEL.

The Central New England is in the market for 1,700 tons of rails.

The New York, Ontario & Western has ordered 4,000 tons of rails.

The Wabash has ordered 2,500 tons of rails from the Lackawanna Steel Co.

The Great Northern has ordered 2,000 tons of rails from the Lackawanna Steel Co.

The Northern Pacific has ordered 20,000 tons of rails from the Lackawanna Steel Co.

The Chicago & Alton has ordered 1,000 tons of rails from the Lackawanna Steel Co.

The Pittsburgh, Shawmut & Northern has ordered 3,000 tons of rails from the Carnegie Steel Co.

The Erie is in the market for a bridge on the Mahoning division, requiring 1,500 to 2,000 tons.

The Chicago, Burlington & Quincy has ordered 5,000 tons of rails from the Lackawanna Steel Co.

The Chicago, Milwaukee & St. Paul has ordered 5,000 tons of rails from the Lackawanna Steel Co.

The Atlantic Coast Line has ordered 10,000 tons of rails from the Tennessee Coal, Iron & Railroad Co.

The Louisville & Nashville has ordered 30,000 tons of rails from the Tennessee Coal, Iron & Railroad Co.

The St. Louis & San Francisco has ordered 25,000 tons of rails from the Tennessee Coal, Iron & Railroad Co.

The Bartlett-Hubbard Railway, Bartlett, Tex., is in the market for 2,000 tons of 56-lb. relaying or new rail.

The Joplin, Neosho & Springfield is in the market for 16,000 tons of rails and four 75-ft.-span single-track bridges.

The Pennsylvania Lines West have ordered 1,300 tons of structural steel from the Massillon Bridge & Structural Co.

The Harriman Lines have ordered 40,000 tons of rails from the Illinois Steel Co. and 20,000 tons from the Tennessee Coal, Iron & Railroad Co.

The Lake Shore & Michigan Southern has ordered the 5,000 tons of rails mentioned in the *Railroad Age Gazette* of September 10 from the Lackawanna Steel Co.

General Conditions in Steel.—Rail buying has been heavy. It is estimated that the rail mills have this year booked orders for over 2,000,000 tons. Recent contracts for between 400,000 and 500,000 tons are mostly for delivery early next year. There is still considerable activity in raw material. The Carnegie Steel Co. recently ordered 40,000 tons of Bessemer pig iron at $17. Twenty thousand tons had been ordered at the same price previously by another company.

RAILROAD STRUCTURES.

Bossier City, La.—The Queen & Crescent Route expects to build a combined passenger station and freight house.

Buenos Aires, Argentina.—Bids are wanted for the metal section of a drawbridge over the Salado river at Ministerio de Obras Publicas (Direccion General de Contabilidad), Buenos Aires.

Carlisle, Ky.—The Louisville & Nashville will remodel its passenger station.

Cleveland, Tenn.—The Southern will build a passenger station.

Corsicana, Tex.—The Houston & Texas Central and the St. Louis Southwestern will remodel the union depot.

Couderay, Wis.—It is reported that the Chicago, St. Paul, Minneapolis & Omaha will build a roundhouse with turntable and repair equipment.

Dallas, Tex.—The Chicago, Rock Island & Pacific, the Trinity & Brazos Valley and the St. Louis & San Francisco expect to jointly build freight houses and terminal yards at Dallas. Officers are quoted as placing the estimated cost at $600,000, although no work has yet been authorized. (Dec. 25, 1908.)

Edmonton, Alb.—See Grand Trunk Pacific under Railroad Construction.

Fitzgerald, Ga.—An officer of the Atlanta, Birmingham & Atlantic writes that bids were asked for September 21 for putting up a concrete passenger station two stories high, 43 ft. x 204 ft., in Fitzgerald, to cost $20,000. Work is to be started about October 10.

Fort Concho, Tex.—An officer of the Kansas City, Mexico & Orient writes that an eight-stall roundhouse will be built soon.

Hammond, Ind.—The Chicago & Western Indiana has let contracts for the construction of a double-track, Strauss, trunnion bascule bridge over the Calumet river. The clear span is to be 120 ft. and the length of the movable span 180 ft. The American Bridge Co. will furnish the steel.

Jerome, Idaho.—The Idaho Southern has under consideration the question of putting up a bridge over the Snake river canyon on the proposed extension from Jerome south to Twin Falls. The bridge is to be 550 ft. above water, with a clear span of 1,140 ft. at a point 800 ft. below and in plain sight of the Shoshone falls, which have a drop of 210 ft.

Lima, Ohio.—Contract is said to have been given to Val Heil for building a station for the Ohio Electric Railway Co. The building is to cost $200,000 and the work is to be finished within one year.

Louisville, Tenn.—The Louisville & Nashville will build a passenger station.

Monmouth, Ill.—The Rock Island Southern is planning to put up a power house at the Edwards river. Two turbine units rated at 15,000 k.w. each will be installed.

New Albany, Miss.—The St. Louis & San Francisco and the Mobile, Jackson & Kansas City will jointly build a union passenger station.

New York.—The New York State Public Service Commission, First district, has refused the application of residents for an order directing that a new station be built in the Interborough Rapid Transit subway at St. Nicholas avenue and 175th street.

Pocahontas, Ark.—The St. Louis & San Francisco is planning to build a bridge over the Black river to cost about $100,000.

Prince Rupert, B. C.—See Grand Trunk Pacific under Railroad Construction.

St. Joseph, Mo.—See Interstate Railway under Railroad Construction.

St. Louis, Mo.—An officer of the Missouri, Kansas & Texas writes that the contract for filling in the site of the new freight yards in the north end of the city has been let to J. A. Daly, Nevada, Mo., and that the yards together with a roundhouse and other buildings are to be finished by next spring. A freight house and terminals are to be built in the heart of the city but the site has not yet been fully acquired. The building of all culverts and bridges and the laying of tracks on the new work will be done by company forces and the remainder of the work will be contracted for.

San Angelo, Tex.—See Kansas City, Mexico & Orient under Railroad Construction.

Scranton, Pa.—The Delaware, Lackawanna & Western is putting up large machine shops at Scranton.

Seattle, Wash.—See Oregon Railroad & Navigation Co. under Railroad Construction.

Smithville, Tex.—The Aransas Harbor & Northern expects to build a bridge over the Guadaloupe river and several smaller bridges.

Vancouver, B. C.—An officer of the Great Northern writes that nothing definite has been decided as yet regarding the proposed terminal improvements, including freight buildings to be made along the water front at Vancouver. (Sept. 10, p. 481.)

Venice, Ill.—The Illinois Traction System is putting up a power house at Venice. The Central Illinois Construction Co. is the contractor and H. C. Patterson is the engineer in charge.

Voth, Tex.—The Texas & New Orleans will build a combined passenger station and freight house.

Waco, Tex.—According to press reports the St. Louis Southwestern will start work soon on a concrete, stone and iron freight house, about 500 ft. long, in Waco at the corner of Eighth and Mary streets.

Winnipeg, Man.—See Grand Trunk Pacific under Railroad Construction.

SIGNALING.

Mechanical interlocking plants are to be installed at Armourdale and Manhattan, near Kansas City, at junctions or joint tracks of the Union Pacific and the Chicago, Rock Island & Pacific.

Supply Trade News.

The Chicago, Milwaukee & Puget Sound has ordered two rotary snow plows from the American Locomotive Co.

M. H. Hovey, formerly signal engineer of the Illinois Central, is now signal engineer for the American Railway Signal Co., Cleveland, Ohio.

W. G. Hovey, heretofore with the General Railway Signal Co., Rochester, N. Y., has resigned his position with that company and is now special eastern agent for the Hall Signal Co., New York.

W. L. Loveland, formerly manager of the dynamo machinery department of the Allis-Chalmers Co., Milwaukee, Wis., has resigned to become general manager of the Mines & Smelter Supply Co., New York.

The Scullin-Gallagher Iron & Steel Co., St. Louis, Mo., has ordered from the J. A. Fay & Egan Co., Cincinnati, Ohio, new machinery for the pattern shop that is being built, as mentioned in the *Railroad Age Gazette* of September 17.

The Lackawanna Bridge Co., Lackawanna, N. Y., has ordered 20 thirty-horse-power motors and will operate its plant by electricity. An order has also been given to the Cleveland Punch & Shear Works, Cleveland, Ohio, for a number of punches.

The Lawndale Railway & Industrial Co., Lawndale, N. C., has ordered a 12-in. x 16-in. consolidation locomotive from the Vulcan Iron Works, Wilkesbarre, Pa. This locomotive is to be a duplicate of one recently shipped to the road by the Vulcan company.

The O. M. Edwards Co., Syracuse, N. Y., has received orders for steel trap doors and car window fixtures for 25 large electric interurban cars for the Washington, Baltimore & Annapolis Ry. These cars are being built at the Niles Car & Manufacturing Co., Niles, Ohio.

The Isthmian Canal Commission asks bids up to October 4 on locomotive tires, sheaves, ratchet wheels, pinions, wire netting, canvas belting, lumber piles, etc. (Circular No. 537.) Bids are asked up to October 1 on crucible steele, wire rope and friction clutch couplers. (Circular No. 537-B.)

In view of the application for a receiver for the Chicago Railway Equipment Company by a holder of 5 shares of stock in the company, valued at $500, this stockholder having been at odds with the management for nearly ten years, charging mismanagement, it is interesting to note that on Saturday last the company declared its fifty-second regular quarterly dividend. This was a dividend of 1¾ per cent., amounting to forty-three thousand dollars.

John B. Sarpy Berthold died on September 14 at St. Louis, Mo., after an illness of four years. The immediate cause of death was heart disease. Mr. Berthold was the senior member of the firm of Berthold & Jennings and president of the Excelsior Car Roof Co., St. Louis. He had been identified with the lumber business for many years. He retired from active business about ten years ago because of failing health, though still retaining his interest in the firm. He was born in St. Louis in 1848 and entered the lumber business as an employee of Bogy & Fry, a lumber firm which had succeeded the early firm of Joseph Bogy. He and Curtis M. Jennings, who was also an employee of that firm, in 1872 bought out the interest of Bogy & Fry and established the firm of Berthold & Jennings.

TRADE PUBLICATIONS.

Mono-Railway.—The Elevated Mono-Railway Co., Washington, D. C., has published a pamphlet describing, with illustrations, its elevated mono-railway plan.

Drill Grinding.—The Cleveland Twist Drill Co., Cleveland, Ohio, is sending out in the form of a folder a reprint of an article on the proper grinding of drills.

Metallic Packing; Anti-Leaking Compound.—The H. W. Johns-Manville Co., New York, has published a folder describing Morris metallic packing. This packing is made of a soft gray cast iron, specially treated.

Another folder describes the J. M. Regal anti-leak stick, which is a tough rubbery compound for permanently repairing leaks in roofs of tin, slate composition, etc., wooden and iron tanks, etc.

Union Pacific.—The summer resorts and mountains of Colorado are the subject of a copyrighted pamphlet being distributed by the Union Pacific. Interesting data concerning the weather, rain fall and humidity in Colorado is given.

Motor Truck.—The American Locomotive Co. has published an illustrated seven-page pamphlet describing its new type of short wheel base motor truck, with steel plate side frames, for city service. Features of the truck are: saving in weight and simplified construction.

"North Pacific Coast Country."—This book for the tourist arranges in very attractive form its information on the north coast cities and other points of interest to the sightseer in that land beyond the Rockies. A short description of Alaska is included with two views of the scenery along the White Pass & Yukon Ry. The publication contains 65 pages, 50 photographs and four maps.

"Black Hills."—The Chicago & North Western has distributed a 50-page booklet describing the Black Hills country, "the richest 100 miles square in the world." The mining industries and the health resorts of the region are most emphasized, especial mention being made of the fact that the United States government has recently established there a sanitarium for disabled soldiers.

Lehigh Valley.—The Lehigh Valley is distributing two new folders, one giving a list and descriptions of the points of interest on the road between New York and Niagara Falls, the other giving information about the coming Hudson-Fulton celebration, the opening day of which is September 25. The addresses of the Lehigh Valley ticket offices and bureaus of information in New York City are given.

Car Fittings.—A recent pamphlet of the General Railway Supply Co., Chicago, illustrates and describes various specialties for passenger cars, including metallic (steel) sheathing, National steel trap-door, Schroyer friction curtain roller, Garland ventilator (a special folder has also been prepared regarding this device), Flexolith composition flooring, National vestibule curtain catches, roller deck sash ratchet, Imperial car window screen, Perfection sash balance and National standard roofing.

Industrial Cars and Track Material.—Catalogue No. 200 of the Ernst Wiener Co., New York, illustrates and describes a wide variety of equipment for industrial roads, including rails, floor plates and other track fittings, cars of many designs, track tools, etc., coal and contractors' buckets and belt hoists. The bulletin has 130 pages and is printed in both English and Spanish. Dimensions, weights and prices are given throughout, as well as tables showing amount and kind of track equipment needed per mile for various weights of rail.

Interlocking.—The Union Switch & Signal Co., Swissvale, Pa., has issued an illustrated 75-page catalogue and price list of interlocking and signaling devices. Electro-pneumatic appliances shown in this catalogue are those designed and developed since the 1907 catalogue. Switch fittings, including detector bars, rods, etc., common to all interlocking systems, are in the company's mechanical catalogue, while appliances used for automatic control of electro-pneumatic interlocking and electric signals are listed in the catalogues covering such articles.

FOREIGN RAILWAY NOTES.

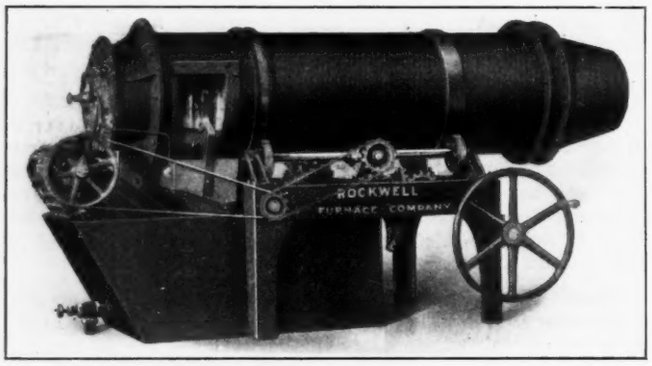
The Egyptian State Railways are asking bids up to October 25 for building a new double-track bridge over the Nile at Cairo and removing the present bridge.

The Mexico Steel & Chemical Co. has been organized with $500,000 capital to make rails, steel castings and chemical products. It is understood that a plant will be built within a year.

Continuous Annealing and Hardening Furnaces.

The Rockwell Furnace Co., New York, has recently improved its internally-fired rotary furnace, giving a greater flexibility in range of work handled by it, and greatly adding to its durability.

Heretofore, these furnaces were built only with special lining brick, which formed deep helical channels with separating spiral walls for feeding the material forward. This arrangement worked very well for light smooth pieces, such as lock washers, balls, etc., and is still spirally lined for this class of work, but was found to be unsuitable for long pieces, such as bolts, rivets, etc., and irregular-shaped steel



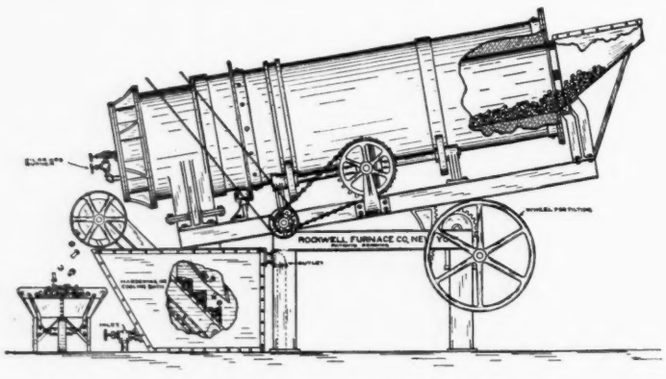
Annealing and Hardening Furnace.

punchings, forgings, castings, etc., and other methods of feeding the material through the furnace were required.

In the present type of furnace, for smooth or round work the rotating cylinder or drum is lined with a standard hard refractory brick, with a smooth internal surface. The furnace is mounted in such a manner that its axis may be tilted at an angle, giving the revolving hearth an incline with the discharge end lower than the entrance or feed end. The gradual incline causes the material to feed forward, and by means of a hand wheel the degree of pitch may be adjusted so as to regulate the progression of the material through the furnace and consequently the time of heating.

The material is charged in a hopper in bulk at the exhaust end of the furnace and fed automatically into the chamber; the material comes continually in contact with the newly-heated surface of the chamber, which is revolving, thereby absorbing the heat from the lining as well as from the heated gases. In a stationary furnace the heat from the sides and roof are not utilized, as the material remains in a fixed position, that farthest removed from the heat requires a much longer period to be brought to the desired temperature, and the more exposed pieces are liable to overheating; others are insufficiently heated and a much longer time is required.

Tests of material being heated and hardened in the internally-fired rotary furnace at the rate of 2,000 lbs. per hour have failed to show the slightest variation; with a pyrometer to insure the proper temperature and the chamber tilted to feed at the proper speed the product must be absolutely uniform.

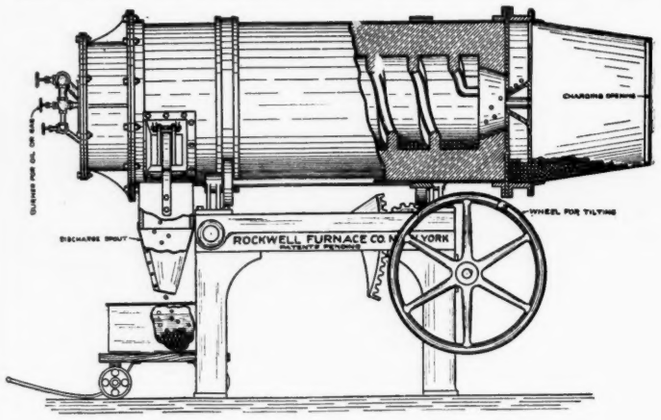


Inclined Furnace with Plain Lining.

In operation, the pieces are fed continuously into one end of the cylinder. The furnace is fired internally from the opposite end, with the zone of highest temperature at the discharge end. The cylinder revolves slowly (1 to 4 revolutions per minute), and owing to the slight inclination of the furnace, the pieces treated fall slightly forward at each revolution, gradually progressing toward the discharge end, where they enter a proper receptacle or bath upon reaching the desired temperature.

To prevent oxidation, the end of the discharge spout may be carried beneath the level of the bath, thereby sealing it and excluding the air.

By this method, clogging or retardation of the work is avoided, as there are no corners or pockets in which the pieces can lodge. Wear of the lining is reduced to a minimum and does not require renewal until the greater portion of the brick is worn away. In certain classes of work, such as balls, nuts, and uniform shapes, the helical or worm type is used, and this furnace may be lined either way, as preferred, but where the smooth lining can be used the cost is less and a greater life is insured. Oil or gas fuel may be used. These



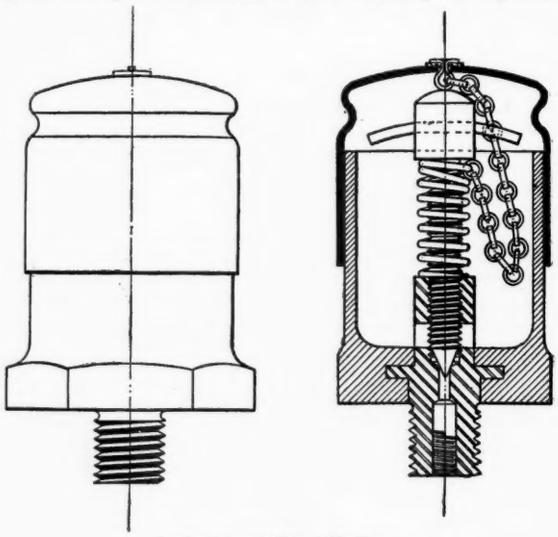
Inclined Furnace with Helical Lining.

furnaces are built to suit a wide range of requirements, and in sizes at present that will handle up to 2,000 lbs. of stock per hour.

These furnaces are now built with a continuous discharge that is shown in the tracing of the furnace without the helical lining. The earlier design was equipped with a door, which was only open a portion of the revolution, and which was often clogged by the pieces passing through it. The door type did not permit of water sealing the discharge spout, thereby preventing the air from coming in contact with the heated stock and oxidizing it.

Indestructible Oil Cup.

The accompanying illustration shows the Indestructible oil cup manufactured by the United States Metallic Packing Co., Philadelphia, Pa. The cup has been designed to have a maximum of strength at a low cost. The shank is of machinery steel and, consequently, it is claimed to be impossible to break it when screwing the cup down, as



Indestructible Oil Cup.

was often the case with the brass cup of similar design. The cover is of pressed steel and is attached to the body of the cup by a steel chain. With the brass cups, much trouble was experienced from the lids being stolen, particularly on locomotives. This will not be the case with the steel lid, and the chain will prevent its falling or jarring off.

These cups will be furnished either with a needle feed or wick feed, as desired, and with the shanks of any desired diameter and number of threads. The standard cup, as illustrated, has ¾-in. shank and 14 threads. The method of manufacture of this cup makes it possible to sell the same at a very low figure.